

nova-Institut GmbH ([www.nova-institut.eu](http://www.nova-institut.eu))

## PRESS RELEASE

# Advancements in Carbon Capture and Utilisation (CCU) Technology Pave the Way for Novel Applications From Ethylene, to Polymers, Syngas and Even Diamonds

Tough competition of outstanding innovations unveiled at the CO<sub>2</sub>-based Fuels and Chemicals Conference 2024

**Hürth, 3 April 2024:** This year's nominees for the innovation award "Best CO<sub>2</sub>-Utilisation 2024" prove that CO<sub>2</sub> innovations can be used to produce syngas, polymers, organic fatty acids, ethylene, renewable isopropyl alcohol (IPA), but also aviation fuels and diamonds.

The award is one of the highlights of the **CO<sub>2</sub>-based Fuels and Chemicals Conference** and puts a spotlight on innovative products and technologies in the field of Carbon Capture and Utilisation (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 CO<sub>2</sub> innovation to a broad international audience at Maternushaus, Cologne (Germany) and online on the 17<sup>th</sup> of April 2024.

### Honouring six CO<sub>2</sub> pioneers

#### **D-CRBN – Plasma-based CO<sub>2</sub> 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 CO<sub>2</sub> 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– ECO<sub>2</sub>Cell – Pioneering Modular Syngas Production – (AT)**

ECO<sub>2</sub>Cell is a cutting-edge, modular plant for producing syngas through low-temperature electrochemical conversion of CO<sub>2</sub>. This innovative technology platform efficiently converts CO<sub>2</sub> 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 CO<sub>2</sub> 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<sup>®</sup> – (US)**

E-Jet<sup>®</sup> fuel, Twelve's sustainable aviation fuel (SAF) made from CO<sub>2</sub>, is produced with only three inputs – water, renewable electricity, and CO<sub>2</sub>. E-Jet<sup>®</sup> 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 fewer sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), 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 CO<sub>2</sub>-based Fuels and Chemicals Conference 2024**

The CO<sub>2</sub>-based Fuels and Chemicals Conference 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.

More information is available at [www.co2-chemistry.eu](http://www.co2-chemistry.eu).

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

nova-Institute would like to thank Yncoris for sponsoring the innovation award “Best CO<sub>2</sub>-Utilisation 2024” and CO<sub>2</sub> Value Europe for co-organising the Innovation Award. GIG Karasek is supporting the event as a Bronze Sponsor.

**Find all nova press releases, images and more free-for-press material at [www.nova-institute.eu/press](http://www.nova-institute.eu/press)**

**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](mailto: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 CO<sub>2</sub> utilisation/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 CO<sub>2</sub> utilisation 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 defossilisation of the industry and for a climate neutral future. More information at: [nova-institute.eu](http://nova-institute.eu) – [renewable-carbon.eu](http://renewable-carbon.eu)

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