nova-Institut GmbH
Leyboldstraße 16
50354 Hürth, Germany

Tel: +49 2233 460 14 00
Fax +49 2233 460 14 01
contact@nova-institut.de

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

PRESS RELEASE

"Best CO_2 Utilisation 2025": Celebrating Pioneering Innovation in Carbon Capture and Utilisation Technologies

Six Innovative Technologies Redefining the Future of Carbon Capture and Utilisation at the CO_2-based Fuels and Chemicals Conference 2025

Hürth, 19 March 2025: The "Best CO_2 Utilisation 2025" innovation award is a prestigious recognition shining a spotlight on groundbreaking technologies and products that effectively utilise CO_2. This year, six nominees are driving the future of Carbon Capture and Utilisation (CCU) across various industries, with breakthroughs in novel carbon capture and CO_2 electrolyser systems, sustainable polyurethane technologies, green methanol production, and processes for high-value carbon materials like graphite and carbon nanotubes from CO_2 emissions.

The award ceremony is one of the highlights of the 13th **CO_2-based Fuels and Chemicals Conference**, taking place from 29-30 April 2025 in Cologne, Germany. This hybrid event is the premier forum for the CCU and Power-to-X industries, bringing together over 250 experts from industry, science and policy to explore cutting-edge developments in carbon capture, green hydrogen production, CO_2-based chemicals, materials, and fuels. Addressing the CCU industry's need for long-term CO_2 supply, this year's event will focus particularly on persistent biogenic CO_2 sources, efficient carbon capture technologies, and the constant supply of renewable hydrogen, as well as the large variety of CO_2 valorisation technologies and CO_2-based products.

More information on the event and nominees is available at https://co2-chemistry.eu.

Meet the Nominees: Shaping the Future of CO_2 Utilisation

Innovation in CCU is key to transforming CO_2 into a valuable resource for the chemicals and materials sector, supporting a circular carbon economy. By converting CO_2 into renewable carbon products, these technologies reduce dependence on fossil resources and create new business opportunities.

eChemicles (HU): Low-Temperature Electrolyser Technology for CO_2 Reduction to CO

eChemicles, a recognised Top Innovator by UpLink – World Economic Forum, has developed the world's first containerised, scalable low-temperature CO_2 electrolyser system to revolutionise the chemical industry, driving its transition towards a better tomorrow. The technology is capable of directly utilising CO_2 in a waste-to-wealth manner, transforming emissions into valuable molecules. The electrolyser technology can be easily integrated with existing industrial infrastructure, enabling faster uptake and lower investment cost, without the need for scrapping previously built assets. It also has the

potential to be directly coupled with renewable energy sources, contributing to balancing the intermittency of renewables. The stacked design is scalable, allowing easier transition to larger scales without redesign and providing more flexible scalability.

https://echemicles.com/

Far Eastern New Century Corporation (TW): FENC® TopGreen® CO_2-based NIPU

The world's first CO_2-based NIPU (Non-isocyanate Polyurethane) technology transforms CO_2 into high-performance elastomeric materials. Unlike traditional thermoplastics polyurethanes (TPU), which rely on toxic phosgene and isocyanates, this exclusive NIPU technology offers a safer, sustainable alternative for applications such as waterproof and breathable membranes, shoe uppers, midsoles, elastic fibres, and artificial leather. Utilising Far Eastern Group's carbon capture technology, CO_2 is converted into chemicals with over 50 % CO_2 content, then combined with advanced polymer production to mass-produce CO_2-based NIPU elastomers, achieving permanent carbon capture. This innovation reduces carbon emissions by up to 58 % compared to traditional TPU manufacturing while delivering exceptional performance and sustainability.

https://www.fenc.com/

Oxylus Energy (US): Methanol Producing Electrolyser

Oxylus Energy has developed a direct electrochemical approach to green methanol production. This remarkable carbon electrolysis technology directly converts industrial emissions into sustainable methanol with only renewable electricity and water. With this breakthrough technology, Oxylus can generate carbon-neutral and carbon-negative methanol at a competitive cost to fossil methanol. This approach not only enables direct decarbonisation of industrial emissions via carbon conversion to a liquid product, but also offers an economically viable route to defossilise the hard-to-abate sectors of aviation, shipping, and chemical production, responsible for ~11 % of global emissions.

https://oxylusenergy.com

Skytree (NL): Skytree Stratus

Skytree's Stratus Direct Air Capture (DAC) Park provides a cost competitive source of CO_2 for Power to X facilities. This park can be connected to an electrolyser, which is fed with the water that is a by-product of the carbon capture process. The DAC Park and the electrolyser plant then provide inputs for the production of sustainable fuels at a synthesis plant. Unlike point source carbon capture (PSC), the DAC Park operates independent of other industrial activities, while climate modules allow global deployment; thus, the approach can optimise the DAC Park location based on electrolyser and electricity costs. The low temperature requirements of this technology allow it to be powered with industrial waste heat, geothermal heat & power, and other renewable energy sources.

https://www.skytree.eu/

TNO (NL): Sorption Enhanced DME Synthesis (SEDMES)

The Sorption Enhanced DME synthesis technology – SEDMES – by TNO, provides an essential element in closing industrial cycles and contributing to a circular carbon economy by converting CO_2 efficiently into dimethyl ether (DME). DME has an important market potential in the current energy transition. It can replace diesel and LPG as well as become a major intermitted feedstock for the chemical industry or an important H_2 carrier. SEDMES combines two process steps in one reactor. CO_2 and (green) H_2 is converted to DME in one reactor step with high conversion rates and efficiency due to the in-situ

separation of H_2O. The conversion rate increases significantly (>80 %) reducing recycles and downstream steps. Most recent milestone (2024) includes 1000 hrs operation of a state-of-the-art SEDMES pilot plant.

https://www.tno.nl/en/

UP Catalyst (EE): Battery-Grade Graphite from CO_2

UP Catalyst has developed a process using Molten Salt CO_2 Capture and Electrochemical Conversion (MSCC-EC) Technology to transform CO_2 emissions into long-lived carbon materials such as graphite and carbon nanotubes (CNT). UP Catalyst's technology has the lowest energy requirement per tonne of graphite produced. This technology produces carbon materials in a continuous process at 500-750 °C, significantly lower than the 2,800 °C required for conventional production, using 2x less energy to produce graphite compared to conventional synthetic graphite production methods and 20x less energy to produce CNTs.

https://upcatalyst.com/

Impact and Future Directions

These innovations represent significant strides in addressing the technical and economic challenges of CCU commercialisation across various sectors, from the chemical industry to sustainable fuel production and materials science.

The conference offers a dynamic platform for networking, collaboration and knowledge sharing among industry leaders, researchers, initiatives, and policymakers. It covers critical topics such as innovation strategies in CCU, advanced carbon capture methodologies, and breakthroughs in CO_2-based technologies but also policy requirements. As the global demand for CO_2-based products surges, with current production capacity exceeding 1.5 million tonnes, this conference will explore the pivotal role of CCU in establishing CO_2 as a viable and sustainable renewable carbon feedstock.

For more information and registration details, visit https://co2-chemistry.eu.

The CO_2-based Fuels and Chemicals Conference 2025 conference is supported by visionary sponsors who are committed to promoting CCU in various industries. Enviro Ambient, Holcim and GIG Karasek support the event as sponsors. Yncoris is the sponsor of the innovation award "Best CO_2 Utilisation 2025". This established award, co-organised by nova-Institute and CO_2 Value Europe, recognises pioneers in the field of CCU. CO_2 Value Europe, the European association dedicated to CO_2 utilisation, brings its expertise in promoting sustainable industrial solutions, while Yncoris, a leader in the planning, construction, and operational support for chemical industry plants, supports the commitment to advance sustainable technologies. nova-Institute, an independent research institute, contributes its extensive expertise in renewable carbon cycles and sustainability to the award.

Find all nova press releases, images and more free-for-press material at https://nova-institute.eu/news/pr/

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 CO_2 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_2 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 – renewable-carbon.eu

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

CO_2 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 CO_2 to reduce greenhouse gas emissions and to move away from fossil. More information at https://co2value.eu.

The Association brings together over 110 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:

CO_2 Value Europe
Antonio La Mantia
Director of Communications & Events
Antonio.lamantia@co2value.eu
Phone: +393803281710

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