



Demonstrating sustainable value creation from industrial CO2 by its thermophilic microbial conversion into acetone

Project type: IA – Innovation Action
Start date of the project: 01/10/2021
Duration: 60 months

STRATEGIC INTELLIGENCE BULLETIN 07

Due date		Delivery date	October 2023
Work package	WP 6 – Exploitation, Replication, Communication and Dissemination		
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Dissemination level	Consortium and AXELERA Cluster		

Version and amendments history

Version	Date	Created/Amended by	Changes
01	26/10/2023		



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FOREWORD

We are delighted to release the seventh strategic intelligence bulletin.

In this seventh edition, we would like to highlight the progress in European legislation related the CCU (in the context of the package Fit for 55) as well as the several reports released by the International Energy agency as for instance the Global Energy and Climate Model, the Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach and the World Energy Outlook 2023 .These reports are important in order to understand the energy scenario for the coming years, as well as the forecast for CO₂ projects via CCUS, with a view to achieving carbon neutrality by 2050.

A call for evidence and public consultation launched on industrial carbon management under European Green Deal was performed. A CCUS consultation at French level has been also launched. The use of CO₂ is considered an important point of relevance in both scenarios. These consultations show the growing interest in new CCUS technologies as well as the desire to leverage new projects in the coming years.

Do not hesitate to send us any comments to improve this document by writing or sharing information that could be relevant for the next bulletin to cherif.morcos@axelera.org

Have a good read!



MARKET INFORMATION

Has the time come to scale-up Carbon Capture, Utilisation and Storage?

DWF energy group, 2023

CCUS has had a checkered history. Despite being available for decades, there are still fewer than 30 commercial operational projects worldwide. Progress has been held back by a combination of high costs, technology issues and critically a lack of supportive regulatory frameworks. So what has changed? In this report, DWF's energy team explain why a wide range of interested parties from oil and gas companies to infrastructure investors, asset managers, and pension funds should move now to invest :

- ✓ How deep, large-scale storage will overtake enhanced oil recovery (EOR) as the primary destination for captured CO₂ by 2030;
- ✓ What is behind the growth of the cluster model of large combined projects, bringing together multiple emitters and storage sites using shared infrastructure;
- ✓ How regulation and incentives are being used to address key hurdles to investment and potential barriers to entry;
- ✓ How cross-border partnerships and agreements can pave the way for international CO₂ transport and storage as a service;
- ✓ The role of statutes (law, fiscal regimes, and regulation) and regulator responsibility (liabilities, co-funding) will become the most effective way to address and mitigate challenges across the CCUS project value chain.

[For more information](#)

IEA: Methanol to take a backseat as ammonia blazes the trail in shipping's decarbonization journey

Off shore energy, September 2023

In the ever-evolving quest to decarbonize the shipping industry, ammonia has emerged as the frontrunner, while methanol, despite its current hype, plays a comparatively smaller role, according to the International Energy Agency's (IEA) 2023 Net Zero Roadmap report. [For more information](#)

Carbon Capture, Utilization and Storage

Holcim, 2023

CCUS is a key lever to accelerate Holcim decarbonization journey. With more than 50 CCUS projects around the world and a commitment to invest CHF 2 billion by 2030, Holcim is leading the industry's transition to a net-zero future. The projects are based on mature technologies, driven by the strength



of our engineering teams and advanced partnerships across the value chain. This robust and highly diversified roadmap makes Holcim uniquely positioned as the partner of choice to scale up carbon capture technologies. [For more information](#)

Coalition Pushes For CCU And CCS Inclusion In EU Net Zero Industry Act

Carbon Herald, 2023

A coalition bringing together industry leaders, environmental advocates, and policymakers is urging the European Union to include Carbon Capture and Utilisation (CCU) and Carbon Capture and Storage (CCS) technologies in the Net Zero Industry Act (NZIA) as strategic net-zero technologies.

The collective statement, endorsed by organizations including the Methanol Institute, Eurofer, the Renewable Carbon Initiative, and FuelsEurope, emphasized the crucial role that CCU technologies play in decreasing greenhouse gas emissions and advancing the production of renewable fuels. [For more information](#)

Global Energy and Climate Model

IEA, October 2023

Since 1993, the IEA has provided medium- to long-term energy projections using a continually evolving set of detailed, world-leading modelling tools. First, the World Energy Model (WEM) – a large-scale simulation model designed to replicate how energy markets function – was developed. A decade later, the Energy Technology Perspectives (ETP) model – a technology-rich bottom-up model – was developed, for use in parallel to the WEM.

In 2021, the IEA adopted for the first time a new hybrid modelling approach relying on the strengths of both models to develop the world's first comprehensive study of how to transition to an energy system at net zero CO₂ emissions by 2050. The integrated framework of the IEA's Global Energy and Climate Model (GEC Model) is now the principal tool used to generate detailed sector-by-sector and region-by-region long-term scenarios across IEA publications, including the 2023 update of the Net Zero Roadmap, the World Energy Outlook series and Energy Technology Perspectives series.

Download the GEC Model Methodology document for an in-depth description of the overall approach and features of the model, and download the GEC Model Key Input dataset for selected key input data. [For more information](#)

Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach

IEA, September 2023.



In May 2021, the IEA published its landmark report Net Zero Emissions by 2050: A Roadmap for the Global Energy Sector. The report set out a narrow but feasible pathway for the global energy sector to contribute to the Paris Agreement's goal of limiting the rise in global temperatures to 1.5 °C above pre-industrial levels. The Net Zero Roadmap quickly became an important benchmark for policy makers, industry, the financial sector and civil society.

Since the report was released, many changes have taken place, notably amid the global energy crisis triggered by Russia's invasion of Ukraine in February 2022. And energy sector carbon dioxide emissions have continued to rise, reaching a new record in 2022. Yet there are also increasing grounds for optimism: the last two years have also seen remarkable progress in developing and deploying some key clean energy technologies.

This 2023 update to our Net Zero Roadmap surveys this complex and dynamic landscape and sets out an updated pathway to net zero by 2050, taking account of the key developments that have occurred since 2021. [For more information](#)

World Energy Outlook 2023

IEA , October 2023

The World Energy Outlook 2023 provides in-depth analysis and strategic insights into every aspect of the global energy system. Against a backdrop of geopolitical tensions and fragile energy markets, this year's report explores how structural shifts in economies and in energy use are shifting the way that the world meets rising demand for energy.

This Outlook assesses the evolving nature of energy security fifty years after the foundation of the IEA. It also examines what needs to happen at the COP28 climate conference in Dubai to keep the door open for the 1.5 °C goal. And, as it does every year, the Outlook examines the implications of today's energy trends in key areas including investment, trade flows, electrification and energy access.

This flagship publication of the International Energy Agency is the energy world's most authoritative source of analysis and projections. Published each year since 1998, its objective data and dispassionate analysis provide critical insights into global energy supply and demand in different scenarios and the implications for energy security, climate change goals and economic development.. [For more information](#)

Call for evidence and public consultation launched on industrial carbon management under European Green Deal

European Commission , June 2023

The Commission has published a call for evidence and a public consultation on industrial carbon management – carbon capture, utilisation and storage deployment. Running for 12 weeks, this consultation is aimed at getting input from stakeholders and citizens which will feed into the



Commission's preparations for a new EU strategy for carbon capture, utilisation and storage (CCUS) deployment in the EU. The Commission's communication on an EU strategy for establishing an industrial carbon management market by 2030 is due for publication by the end of 2023. It will cover industrial carbon management through the transport, use, and storage of carbon dioxide (CO₂) captured from fossil fuel, biogenic and atmospheric sources. The new strategy will serve emitters in hard-to-abate sectors who would need to apply carbon capture and storage (CCS), carbon capture and utilisation (CCU) or industrial carbon removals in order to achieve climate neutrality. [For more information](#)

Launch of Demonstration Experiment for CO₂ Capture from Waste-to-Energy Plant Flue Gas for Use in Methanation

Mitsubishi heavy industries, July 2023

The City of Yokohama and Tokyo Gas Co., Ltd. (Tokyo Gas), together with Mitsubishi Heavy Industries, Ltd. (MHI) and MHI Group company MHI Environmental & Chemical Engineering Co., Ltd. (MHIEC), are to launch a demonstration experiment of a CO₂ capture and utilization (CCU) process in which CO₂ is separated and captured from the flue gas of a municipal waste-to-energy plant, and transported to a local methanation demonstration facility operated by Tokyo Gas to be used as feedstock for methanation. This CCU demonstration experiment based on regional cooperation, conducted in Tsurumi-ku, Yokohama, is the first of its kind in Japan, which will aim to practically introduce e-methane in addition to improve and expand CCU technology. [For more information](#)

Researchers use carbon capture and utilization technology to recycle industrial carbon dioxide

Phys org – September 2023

A team of researchers from Chung-Ang University in Korea are conducting research on CCU processes that use waste materials or abundant natural resources as raw materials to ensure their economic feasibility.

The team, led by Professor Sungho Yoon and Associate Professor Chul-Jin Lee, recently published a study where they discuss the utilization of industrial CO₂ and dolomite—a common and abundant sedimentary rock that is a rich source of calcium and magnesium—for the production of two commercially viable products: calcium formate and magnesium oxide. [For more information](#)

OGCI updates CCUS Hub Playbook and expands access to help accelerate industrial decarbonization

Oil and Gas Climate Initiative , September 2023

The Oil and Gas Climate Initiative (OGCI) has updated the CCUS Hub Playbook, a step-by-step guide for regulators, emitters, and carbon transport and storage operators who want to build on the



experience of carbon capture, utilization and storage (CCUS) hubs already in advanced development.

CCUS hubs support the infrastructure needed to transport and store multiple sources of carbon dioxide at scale. This creates significant potential to decarbonize industries and entire regions at scale and speed while protecting and creating jobs and opportunities in new low-carbon technologies. [For more information](#)

IEA's new CCUS projects database: a tool for driving much needed progress

Energy post EU, April 2023

The IEA has made available for the first time its CCUS projects database. The number of countries with plans to develop CCUS now stands at 45, with seven more countries – in central and southern Europe, the Middle East, and Southeast Asia – joining the list in 2022. The database covers CO₂ capture, transport, storage, and utilisation projects worldwide commissioned since the 1970s, and have an announced capacity of more than 100,000 tonnes/year (or 1,000 tonnes/year for direct air capture facilities). Mathilde Fajardy, Carl Greenfield and Rachael Moore at the IEA summarise the findings and the CCUS landscape. They note that a new trend is developing: the breaking up of the CCUS value chain, which is allowing new players to emerge. This specialisation can drive innovation and uncover cost reductions in parts of the chain, as well as enable easier access to CCUS solutions for emitters – something the full-chain developers cannot do so easily. The authors also point at the emergence of the CCUS hub model which spreads infrastructure costs between emitters, and generates economies of scale. They end with their recommendations to governments to keep up with an evolving new sector and support the growth required to meet decarbonisation goals. [For more information](#)

The success of the INITIATE project using carbon capture and utilisation technology

Innovation news network , October 2023

Antonio La Mantia, Director of Communications and Events, and Anastasios Perimenis, Secretary General at CO₂ Value Europe, explore the INITIATE project that uses carbon capture and utilisation to contribute to a climate-neutral and circular economy. [For more information](#)

Supporting aviation in replacing fossil jet fuel: The potential of the TAKE-OFF project

Euractiv, September 2023

Today, human activities are emitting close to 60 gigatons of greenhouse gases per year, largely as a result of the combustion of fossil fuels for the generation and use of energy. This enormous amount of CO₂ emissions is identified by the international scientific community to be the cause of unequivocal changes in our global climate and the degradation of life on Earth. To mitigate climate change, the urgency is to reduce emissions, as well as to substitute fossil-based products by



implementing circular carbon solutions to generate essential everyday goods and services. [For more information](#)

TECHNOLOGY WATCH

State of the Art: CCS Technologies 2023

Global CCS institute, August 2023

The Global CCS Institute published its flagship CCS technology compendium titled State of the Art: CCS Technologies 2023. The compendium showcases a wide range of commercially available CCS technologies, providing readers with insights on the latest advancements made globally. In this second annual release – led and coordinated by the Institute’s Matthew Loughrey, Hugh Barlow and Shahrzad Shahi – the compendium provides an overview of over 70 technologies and solutions, along with details surrounding key benefits and relevant facts and figures tied to the innovations highlighted. [For more information](#)

Capturing (CCS) and valorizing CO₂ (CCU): technologies to fight global warming

Infociments, June 2023.

The reduction in the carbon footprint of the cement industry is an ongoing process since emissions have fallen by 40% between 1990 and today and the set trajectory provides for an additional reduction of 50% by 2030. Several companies are working at the same time on the innovations of tomorrow which will make it possible to go further and achieve a 90% reduction in emissions in 2050. These innovations are based on CCS (CO₂ Capture and Storage) and CCU technologies. (Capture and Use of CO₂)

[For more information](#)

Simplified CO₂ conversion process without a CO₂ capture process

Inceptive mind, October 2023

Carbon capture and utilization technology, one of the methods for achieving net-zero CO₂ emissions, has drawn attention as an innovative technology for reducing CO₂ emissions. However, the high energy consumption required in the process of purification, pressurization, separation, and reuse of CO₂ poses a challenge to the industrial application of these technologies in practice. The research team at the Clean Energy Research Center, Korea Institute of Science and Technology (KIST), has developed a process for producing high-value-added synthesis gas (syngas) by direct electrochemical conversion of CO₂ captured using a liquid absorbent. [For more information](#)



Harmonizing life cycle analysis (LCA) and techno-economic analysis (TEA) guidelines: a common framework for consistent conduct and transparent reporting of carbon dioxide removal and CCU technology appraisal

Frontiers, May 2023

Stabilizing the climate will require significant efforts to curb greenhouse gas emissions, manage emissions that cannot be avoided, and remove as many legacy emissions as possible [i.e., carbon dioxide (International Energy Agency, 2020; Author Collective, 2022)]. In that context, negative emissions technologies will take CO₂ from the air (Direct Air Capture) or the water (Direct Ocean Capture) and permanently remove it (Roger et al., 2021) either by sequestering the CO₂ underground or converting it to so-called Track 1 materials (Sick et al., 2021) that have lifetimes of >100 years. Shorter-lived products that decompose back into CO₂ in < 100 years are categorized as Track 2 materials and will at best be carbon neutral. A carbon neutral status can also be achieved if captured CO₂ from fossil-based point sources is sequestered or used to create Track 1 materials. Conversion of CO₂ from fossil-based sources to any Track 2 material and subsequent decomposition would add new fossil-based carbon to the atmosphere, constituting an ultimately undesirable process. The overall carbon footprint of a process or product will depend on many factors associated with the carbon production, use, and disposal phases. [For more information](#)

Current status of carbon capture, utilization, and storage technologies in the global economy: A survey of technical assessment

Science Direct, June 2023

Abstract The latest tremendously rapid expansion of the energy and industrial sector has led to a sharp increase in stationary sources of CO₂. Consequently, a lot of concerns have been raised about the prevention of global warming and the achievement of climate mitigation strategies by 2050 with a low-carbon and sustainable future. In view of this, the current state of various aspects of carbon capture, utilization, and storage (CCUS) technologies in general technical assessment were concisely reviewed and discussed. We concentrated on precisely identifying the technology readiness level (TRL), which is beneficial to specifically defining the maturity for each key element of the CCUS system with a commercialization direction paths. In addition, we especially presented and emphasized the importance of CO₂ capture types from flue gases and CO₂ separation methods. Then, we determined valuable data from the largest R&D projects at various scales. This paper provides a critical review of the literature related to challenges of the CCUS system that must be overcome to raise many low TRL technologies and facilitate their implementation on a commercial scale. Finally, our work aims to guide the further scaling up and establishment of worldwide CO₂ emission reduction projects. [For more information](#)

CO₂Fix: An approach to assess CO₂ fixation potential of CCU reaction pathways

Gasim Ibrahim, Mohamed S. Challiwala, Hanif A. Choudhury, Guiyan Zang, Mahmoud M. El-Halwagi, Nimir O. Elbashir, October 2023



Abstract: In this work we present a simple, yet powerful, metric for estimating the potential of a CCU reaction pathway to fix CO₂. The CO₂Fix metric is determined by using a model that accounts for various process variables and parameters that influence the ability of the reaction to convert CO₂ in addition to its propensity to produce CO₂ through the energy requirements of the process. The CO₂Fix metric in this work accounts only for the direct CO₂ emissions and indirect CO₂ emissions related to the reaction portion of a CCU process. We demonstrate the use of the model to estimate the CO₂Fix in two case studies representing common CCU reactions: dry reforming of methane (DRM) and CO₂ hydrogenation to methanol. When using natural gas-powered energy, and under the same process assumptions, the CO₂Fix was estimated to be 1.1 and 3.9 for the DRM and CO₂ hydrogenation reactions respectively. [For more information](#)

Carbon capture and utilization for industrial applications

Talieh Rajabloo, Joris Valee, Yves Marenne, Leo Coppens, Ward De Ceuninck, April 2023

Heavy industries such as cement, iron and steel, oil refining, and petrochemicals are responsible for about 22% of global carbon dioxide (CO₂) emissions. There exist several pathways for global CO₂ mitigation. Capturing, storage, and utilization of CO₂ (CCS and CCU) provide an operational solution for significant emission mitigation. High purity CO₂ streams are the most interesting points for CCS and CCU. Pure CO₂ streams are suitable for compression, transport, and storage. Capture technology categories are typically pre-combustion, oxy-fuel combustion, and post-combustion processes. Moreover, the main challenges of the robust industrial CCS/U development are the high costs of CO₂ separation from flue gas or ambient air and the conversion of CO₂ in various utilization pathways. This research study includes a summary of several CCS technologies and CCU pathways, their current status, cost, and industrial deployment.

[For more information](#)

CCU/S in North America -Lessons Learned for Germany

Jakob Eckardt, Jannik Hoehne, Saskia Lengning, Dr Christian Kluge, Lea Mohnen, Marie Münch, Bastian Stenzel, January 2023

This study provides an overview of the current situation with regard to carbon capture, utilization and storage (CCU/S) in North America. When it comes to the use of these technologies, both the US and Canada are considered pioneers on a global scale – accordingly, experiences from these markets can also be informative for the debate in Germany.

[. For more information](#)

Achieving artificial carbon cycle for high-emitting industries and CCU technology: Case of China

Zhenye Zhang, Pengjun Yi, Shanying Hu, Yong Jin, August 2023



Process-related carbon emissions, which cannot be completely eliminated by the improvement of processes and energy structure, are recognized as an enormous challenge for in-depth decarbonization. To accelerate the achievement of carbon neutrality, the concept of 'artificial carbon cycle' is proposed based on the integrated system of process-related carbon emissions from high-emitting industries and CCU technology as a potential pathway towards a sustainable future. This paper conducts a systematic review on the integrated system with the case of China, which is the largest carbon-emitting and manufacturing country, to provide a clearer and more meaningful analysis. Multi-index assessment was used to organize the literature and draw the useful conclusion. Based on literature review, the high-quality carbon sources, reasonable carbon capture approaches and promising chemical products were identified and analyzed. Then the potential and practicability of the integrated system was further summarized and analyzed. Finally, key factors of future development including technology improvement, green hydrogen, clean energy and industrial cooperation were stressed to provide a theoretical reference for future researchers and policy makers. [For more information](#)

Comprehensive Carbon Management New thinking and terminology are required to achieve climate targets and secure a sustainable carbon supply

Christopher vom Berg, Michael Carus and Lara Dammer, October 2023

Comprehensive carbon management goes beyond CO₂ emissions, capture and long-term storage. It decouples the whole industry from fossil feedstock, eliminates the use of fossil carbon wherever possible and allocates renewable carbon (from biomass, CO₂ and recycling) as efficiently and effectively as possible where carbon use is unavoidable. The aim is to achieve the lowest possible CO₂ emissions, reducing the need for Carbon Dioxide Removal to achieve net zero, and to provide a secure supply of renewable carbon to all dependent industries such as chemicals and materials. Only when carbon is recognised as a raw material in carbon management strategies can truly sustainable carbon cycles be achieved. With a proper comprehensive carbon management, the carbon-reliant material and energy sectors will be defossilised and the remaining energy sector will be decarbonised. And only for the remaining share of truly unavoidable emissions, carbon dioxide removal and carbon capture and storage should come into play. [For more information](#)



EU POLICIES & LEGISLATION

Innovation Fund's 3rd Large Scale call: Pace gathers for decarbonisation of cement, but handful of wasteful projects pre-selected

Bellona , April 2023

the European Commission announced the projects which have been pre-selected to receive finance from the Innovation Fund's 3rd call for large-scale projects. Part of the revenues generated by the EU ETS are set aside to support the deployment of innovative decarbonisation projects. In this call, 41 projects were selected (out of 196 eligible projects), totalling €3.6 billion of funding. Bellona is a member of the Innovation Fund Expert Group and provides input to the design of the selection criteria.

The pre-selection this year is marked by the proliferation of carbon capture and hydrogen projects, with differing climate outcomes. In this article, we highlight some key successes, on the deployment of CCS in harder-to-abate sectors, and concerns, with the utilisation of fossil carbon and the absence of additional renewable energy to support RFNBO projects. [For more information](#)

EU Policy Context - CO2 Value Europe Days, 5th -6 th October 2023, Terrassa, Barcelo Tudy Bernier, October 2023

Full presentation performed in the context of CO2 value days in Terrasse, Barcelona. [For more information](#)

Carbon Capture and Utilisation (CCU) should be recognised as a strategic net zero technology in the EU Net Zero Industry Act

CO2 Value Europe newsletter, October 2023

The co-signatories of this letter call on Members of the EU Parliament and EU Member States to take position to include CCU technologies as part – along with CCS – of the list of strategic net-zero technologies in the Net Zero Industry Act (NZIA). CCU technologies will enable the supply of renewable fuels and other alternative sources of energy, as well as commercial products such as plastics, concrete, and reactants for chemical synthesis. CCU is of strategic importance to reach net zero objectives, and should be recognized as such also in the NZIA, considering that its relevance has been acknowledged by recent legislations and by EU funding mechanisms – in the EU Innovation Fund's third call for large-scale projects from July 2023, out of 41 projects selected, at least 10 projects were about CCU. These technologies represent an array of solutions critical for the achievement of the EU climate and energy ambitions, and will support both the realization of EU hydrogen goals and a crucial element of the CO2 value chain, as well as creating products that will displace fossil resources. Allowing CCU projects to benefit from the priority status of a strategic net zero technology will help:

- Unleashing their potential for emission reductions and carbon circularity while maintaining and



enhancing the skilled technical workforce in Europe.

- Ensuring the necessary predictability that these technologies need to be deployed by sending a clear signal and help provide investment certainty.
- Aligning the Net Zero Industry Act with the technological priorities in the recent Fit for 55 legislations.

[For more information](#)

Joint Industry Letter on the Urgent Need for an RFNBO Certification Framework CO2 Value Europe, June 2023

The signatories of this letter welcome the regulatory clarity provided by this week's entry-into-force of the RED II Delegated Acts on Article 27.3 and Article 28.5 that define the production criteria for Renewable Fuels of Non-Biological Origin (RFNBOs) and Recycled Carbon Fuels (RCFs). Now, these production criteria need to urgently be complemented with comprehensive certification framework. Our sectors crucially depend on the large-scale availability of RFNBOs, supplied cost-competitively and securely across the EU for meeting the objective of climate neutrality. Despite the entry-into-force of the relevant production criteria, the absence of a clear certification framework still hampers the scale-up of the EU's RFNBO market. A harmonised RFNBO scheme is an essential precondition for counting RFNBOs towards the regulatory mandates defined in the RED III, as well as for their commercial development. Both producers and consumers of RFNBOs require certainty that those volumes of hydrogen that are labeled 'RFNBO' truly comply with the production criteria described in the Delegated Acts. This certification must apply consistently across the EU, as well as be enforceable for imported volumes of RFNBOs. [For more information](#)

The Net-Zero Industry Act: Accelerating the transition to climate neutrality

European Commission, 2023

The European Commission proposed the Net-Zero Industry Act (NZIA) on 16 March 2023. NZIA will help strengthen the European manufacturing capacity of net-zero technologies and overcome barriers to scaling up the manufacturing capacity in Europe. The measures in the Regulation will increase the competitiveness of the net-zero technology industrial base and improve the EU's energy resilience. This proposal shows Europe's commitment to playing a leading role in the net-zero technology transition and helping to deliver on the Fit-for-55 and REPowerEU objectives. [For more information](#)

Consultation française sur la stratégie nationale CCUS

Conseil National de l'industrie, June 2023

The French Prime Minister presented this June 23, during a meeting of the National Industry Council (CNI) at Le Bourget, a Carbon Capture, Storage and Use (CCUS) strategy. A consultation with manufacturers was opened until September 29, 2023.

[. For more information](#)



FUNDING & TENDER OPPORTUNITIES

FRANCE

Technology bricks and hydrogen demonstrators (Briques technologiques et démonstrateurs hydrogène)

ADEME

Deadline date: The next cut-off date is 03/01/2024, 21/06/2024, 19/12/2024).

The objective of this call for proposal is to support innovative work to develop or improve components and systems related to the production, transport and use of hydrogen, such as industrial, transport or energy supply applications. The projects must fall within at least one of the four following areas:

Axis 1 - Technological bricks: innovative components and systems;

Axis 2 - Innovative industrial and network pilots (or commercial firsts), temporary or localized energy supply;

Axis 3 - Design and demonstration of new vehicles;

Axis 4 - Eco-design and recyclability. [For more information](#)

Call for proposal " DECARB IND " Decarbonation strategy

ADEME

Deadline date: 2nd deadline 12/12/2023 + other deadlines the following years

DECARB IND aims to reduce the GHG emissions of industrial sites in four areas: energy efficiency , modification of the energy mix, modification of the raw material mix and carbon capture, utilization and storage. [For more information](#)

FUNDING & TENDER OPPORTUNITIES

EUROPE

Breakthrough Energy Catalyst

Deadline date: Submissions evaluated on a rolling basis, but no less frequently than semi-annually

Commission President Ursula von der Leyen and Bill Gates have announced a pioneering partnership between the European Commission and Breakthrough Energy Catalyst to boost investments in the critical climate technologies that will enable the net-zero economy. Presented on the occasion of the sixth Mission Innovation Ministerial meeting, the new partnership aims to mobilize new investments of up to €820 million/\$1 billion between 2022-26 to build large-scale, commercial demonstration projects for clean technologies – lowering their costs, accelerating their



deployment, and delivering significant reductions in CO₂ emissions in line with the Paris Agreement. [For more information](#)

Turning CO₂ emissions from the process industry to feedstock (Processes4Planet partnership) (IA)

Deadline date: 07/02/2024

Expected outcomes: Master the capture, purification and conversion of CO/CO₂ from process industry point sources and utilization of renewable energy at reasonable costs to pave the road to the production of a large range of chemicals and materials; Showcase the system effectiveness for the GHG emission avoidance in the process industries as well as the scalability and the cost efficiency of the proposed concept; Enable the economic viability of the entire unit to compete with the existing state of the art production of the same or equivalent products (e.g., fossil-based production of chemicals and materials); Prove the efficient integration and use of renewable energy sources, and where relevant account for their intermittency and the possibility to offer demand-response flexibility. [For more information](#)

CCU for the production of fuels (Processes4Planet partnership) (IA)

Deadline date: 05/09/2024

Scope: Proposals will aim at the development of energy-efficient and economically and environmentally viable CO₂ conversion technologies, including energy storage and/or displacement of fossil fuels that allow for upscaling in the short to medium term. Proposals have to define ambitious but achievable targets for energy requirements of the conversion process (including catalytic conversion), production costs and product yields that will be used to monitor project implementation. Proposals have to include the potential for the proposed CCU solution(s) as CO₂ mitigation option through conducting an LCA (Life Cycle Assessment) in line with guidelines developed by the Commission, such as the Innovation Fund GHG methodology and the relevant ISO standards and the EU Taxonomy Regulation. [For more information](#)

DACCS and BECCS for CO₂ removal/negative emissions (P4Planet partnership) (IA)

Deadline date: 21/01/2025

The project is expected to develop highly innovative CCUS /carbon negative technologies leading to CO₂ removal. It should enable the cost-effective deployment of technologies such as (DACCS), (BECCS) ideally linking them to industrial clusters with special emphasis of these technologies to safe CO₂ underground storage and CO₂ utilization. Project results are expected to contribute to at least one of the following expected outcomes:

- ✓ Improve existing or develop new materials for DACCS and/or BECCS technologies; or
-



-
- ✓ Address potential barriers to the incorporation of DACCS and/or BECCS technologies in existing CC(U)(S) concepts; or
 - ✓ Make DACCS and/or BECCS technologies a viable option to make the EU carbon neutral by increasing the TRL levels and reducing cost of the different technological options.

[For more information](#)

Innovation fund - Small-Scale Projects

Deadline date: March 2024 (forecast)

With a budget of EUR 1.5 billion, which is increased by 50% compared to the previous call, it will finance breakthrough technologies for renewable energy, energy-intensive industries, energy storage, and carbon capture, use and storage. [For more information](#)

Innovation fund - large-Scale Projects

Deadline date: March 2024 (forecast)

With a budget of EUR 1.5 billion, which is increased by 50% compared to the previous call, it will finance breakthrough technologies for renewable energy, energy-intensive industries, energy storage, and carbon capture, use and storage. [For more information](#)



CCU ONGOING PROJECTS - HORIZON 2020

Providing access to cost-efficient, replicable, safe and flexible CCUS

The ACCSESS concept is centered around the project vision to Develop replicable CCUS pathways towards a Climate Neutral Europe in 2050. ACCSESS will improve CO₂ capture integration in industrial installations (20-30% cost cuts) as a key element to accelerate CCUS implementation, address the full CCUS chain and the societal integration of CCUS. ACCSESS has the ambition unleash the ability of CCUS to contribute to the ambitious EU Green Deal transformation strategy. The project is dedicated to developing viable industrial CCUS business models. ACCSESS will engage with citizens and citizens, explaining how CCUS can contribute to the production of climate neutral or climate positive end-products in a sustainable cities' context. [For more information](#)

Project Information

ACCSESS

Grant agreement ID: 101022487

Start date

1 May 2021

End date

30 April 2025

Funded under

H2020-EU.3.3.

H2020-EU.3.3.2.

Overall budget


€ 18 427 186,75

EU contribution

€ 14 983 874

Coordinated by

SINTEF ENERGI AS

 Norway



Demonstrating a refinery-adapted cluster-integrated strategy to enable full-chain CCUS

Almost everyone now agrees that we should decrease the amount of atmospheric carbon dioxide (CO₂) to mitigate climate change. Reducing CO₂ production is not the only way to reduce emissions. Carbon capture, use and storage (CCUS) refers to an integrated set of technologies to prevent the CO₂ produced during the combustion of fossil fuels from entering the atmosphere. Currently, these technologies focus on the greatest sources of CO₂ in a process, ignoring smaller ones. The EU-funded REALISE project is developing a way to capture up to 90 % of CO₂ from multiple sources in operating refineries at a cost that is 30 % lower than existing capture methods. The project will include the evaluation of the entire CCUS chain from emitter to storage as well as socio-political aspects and social readiness assessments based on three business cases in the EU and China. [For more information](#)

Project Information

REALISE

Grant agreement ID: 884266

Start date

1 May 2020

End date

30 April 2023

Funded under

H2020-EU.3.3.2.

Overall budget

€ 7 131 752,50

EU contribution

€ 6 444 163,75

Coordinated by

SINTEF AS

 Norway



Advanced carbon capture for steel industries integrated in CCUS Clusters

The Paris Agreement sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2 °C and pursuing efforts to limit it to 1.5 °C. Without carbon capture, utilisation and storage (CCUS), it is difficult to realise the temperature levels indicated in the Paris Agreement. In the context of the European Energy Union, CCUS is a vital research and development priority to achieve 2050 climate objectives in a cost-effective way. With the focus on the iron and steel industry as part of the CCUS chain, the EU-funded C4U project will work with eight European countries and Mission Innovation countries (Canada, China and the United States) to address all the essential elements required for optimal integration of CO₂ capture into the North Sea Port CCUS cluster. [For more information](#)

Project Information

C4U

Grant agreement ID: 884418

Start date
1 April 2020

End date
31 March 2024

Funded under
H2020-EU.3.3.
H2020-EU.3.3.2.

Overall budget
€ 13 845 496,89

EU contribution
€ 12 499 083,27

Coordinated by
UNIVERSITY COLLEGE LONDON
United Kingdom



Creating added-value chemicals from bio-industrial CO₂ emissions using integrated catalytic technologies

The European Green Deal sets the blueprint for making Europe the first climate neutral continent in the world. The goal is to reduce greenhouse gas emissions (GHGs) to at least 55 % below 1990 levels by 2030. The EU-funded CATCO2NVERS project will develop and optimize technologies that convert waste CO₂ into useful bio-origin chemicals to produce plastics, methanol, cosmetics, and renewable feedstocks for industrial processes. The project's overall vision will be to use waste CO₂ energy- and resource-efficiently in bio-based industries to produce zero GHGs and reduce the quantity of CO₂ released into the atmosphere. [For more information](#)

Project Information

CATCO2NVERS

Grant agreement ID: 101000580



Start date
1 May 2021

End date
30 April 2025

Funded under
H2020-EU.3.2.4.2.
H2020-EU.3.2.

Overall budget
€ 6 641 111,25

EU contribution
€ 6 641 110,75

Coordinated by
FUNDACION PARA EL DESARROLLO Y LA INNOVACION TECNOLOGICA
Spain



Production of synthetic renewable aviation fuel from CO₂ and H₂

Aviation fuels derived from non-fossil resources are the only way to diminish the hefty carbon footprint of air transport. The EU-funded TAKE-OFF project will bring together leading industrial players and prominent research institutes to develop an innovative process for producing sustainable aviation fuels with higher efficiency and lower costs compared to other power-to-liquid alternatives. State-of-the-art successful attempts to turn carbon dioxide into jet fuel involve complex processes such as the Fischer-Tropsch process. The unique TAKE-OFF technology will be based on converting carbon dioxide and green hydrogen into fuel via ethylene as an intermediate. In this process, carbon dioxide is captured from industrial flue gases and reacts with hydrogen produced by renewable electricity to create light olefins. [For more information](#)

Project Information

TAKE-OFF

Grant agreement ID: 101006799

Start date
1 January 2021

End date
31 December 2024

Funded under
H2020-EU.3.3.3.

Overall budget
€ 5 340 538,75

EU contribution
€ 4 998 788,25



Coordinated by
NEDERLANDSE ORGANISATIE VOOR TOEGEPAST
NATUURWETENSCHAPPELIJK ONDERZOEK TNO
 Netherlands

Creating value from industrial CO₂ sources

Twenty leading industrial and research partners from 11 countries have teamed up to prove that large-scale conversion of industrial carbon emissions into value-added chemicals and materials is possible. As a game changer for European carbon-intensive industries, the EU-funded PYROCO₂ project will pave the way for the sustainability of Europe's chemical industry. It will demonstrate the scalability and economic viability of carbon capture and utilisation to generate climate-positive acetone from industrial CO₂ and renewable electricity-derived hydrogen. The project will demonstrate that the acetone produced is an ideal platform for the catalytic synthesis of a range of chemicals, synthetic fuels and recyclable polymer materials from CO₂ for viable business cases and pre-developed processes for replication and commercialization. [For more information](#)

Project Information

PYROCO₂

Grant agreement ID: 101037009

Start date
1 October 2021

End date
30 September 2026

Funded under
INDUSTRIAL LEADERSHIP - Leadership in enabling
and industrial technologies

Total cost
€ 43 887 817,75

EU contribution
€ 39 999 561,18



Coordinated by
SINTEF AS
 Norway



CO2 capture, utilisation and storage for a net-zero carbon future

With climate change putting people worldwide in danger and nations taking steps to decrease its effects, new innovations regarding green solutions are more welcome than ever. The EU-funded ConsenCUS project aims to assist in this goal by providing an industrial plan for a net-zero carbon reality. To this aim it will utilise 3 electricity-based innovations: carbon capture based on alkali absorption, methods for conversion of CO₂ to formate and formic acids for market uses and finally a safe cyclic loading system of CO₂ into salt formations and aquifers for storage purposes. These innovations should greatly benefit the EU in reaching its net-zero carbon goal. [For additional information](#)

Project Information

ConsenCUS

Grant agreement ID: 101022484

Start date

1 May 2021

End date

30 April 2025

Funded under

SOCIETAL CHALLENGES - Secure, clean and efficient energy

Total cost

€ 13 905 272,50

EU contribution

€ 12 862 331,88

Coordinated by

RIJKSUNIVERSITEIT GRONINGEN

 Netherlands



Zero Emission Network to facilitate CCUS uptake in industrial clusters

Carbon capture, utilisation and storage (CCUS) technology is an important tool in reducing climate change. The EU-funded CCUS ZEN project will increase the rollout of CCUS technology in Europe through knowledge-sharing and the development of specific action plans, focusing specifically on the Baltic Sea and Mediterranean Sea regions. The project consortium will bring together 15 partners with leading expertise in all aspects of CCUS value chains. CCUS ZEN will select at least eight value chains (four in each region) for detailed study and comparison with successful value chains from the North Sea region. This will result in policy recommendations for CCUS value chain development, including CO₂ source mapping, generic technical frameworks and business plan models. [For additional information](#)

Project Information

CCUS ZEN

Grant agreement ID: 101075693

DOI

[10.3030/101075693](https://doi.org/10.3030/101075693)

Start date

1 August 2022

End date

31 January 2025

Funded under

Climate, Energy and Mobility

Total cost

€ 1 782 627,50

EU contribution

€ 1 782 627,50

Coordinated by

SINTEF AS

 Norway



Implementation Plan for Actions on CCUS Technologies in the SET Plan

Carbon capture, utilisation and storage (CCUS) can be applied across the energy system. While CCUS technologies will no doubt play a big role in decarbonisation of the European energy and industrial sectors, they have not been developed in Europe to the extent required. The EU-funded IMPACTS9 project will support the EU's implementation of the Strategic Energy Technology (SET) Plan – a major tool to contribute to cost reduction and improve performance of low-carbon energy technologies through impactful synergistic innovation actions. The project consortium is composed of organisations highly representative of the related stakeholders and will engage with them for their active contribution in implementation of the SET Plan. [For additional information](#)

Project Information

IMPACTS9
Grant agreement ID: 842214

DOI
10.3030/842214

Closed project

Start date
1 May 2019

End date
30 April 2022

Funded under
SOCIETAL CHALLENGES - Secure, clean and efficient energy

Total cost
€ 1 100 298,75

EU contribution
€ 1 100 298,75

Coordinated by
THE CARBON CAPTURE AND STORAGE ASSOCIATION
United Kingdom



SUNER-C: SUNERGY Community and eco-system for accelerating the development of solar fuels and chemicals.

Photovoltaic power is increasingly competing with grid power in the EU and around the world. Soon, sunshine could be used to decarbonise air travel. The potential in solar fuel is shining. The EU-funded SUNER-C project will put these uses under a bright spotlight. Bringing together 31 organisations from a variety of sectors and across the EU, the project will speed up the development of solar fuels and chemicals. By replacing fossil-derived fuels and chemicals with renewables and carbon recycling, SUNER-C aims to contribute to the creation of a circular economy. [For additional information](#)

Project Information

SUNER-C
Grant agreement ID: 101058481

DOI
10.3030/101058481

Start date
1 June 2022


End date
31 May 2025

Funded under
Digital, Industry and Space

Total cost
€ 4 026 403,75

EU contribution
€ 3 997 646

Coordinated by
UNIVERSITEIT UTRECHT
Netherlands



innoVative bio-based chains for CO₂ VALorisation as aDded-value organic acids

The conversion of industrial CO₂ emissions is gaining significant interest as a strategy to alleviate the effects of climate change. Bio-based industries are primary candidates to turn emissions into feedstock. The EU-funded VIVALDI project proposes an integrated solution for the conversion of biogenic CO₂ into added-value organic acids (succinic, itaconic, 3-hydroxypropionic and lactic) powered by ground-breaking advances in CO₂ electrochemical conversion and bioprocess engineering. The solution will involve CO₂ enrichment from industrial sources and its electrochemical reduction to formic acid (FA) and methanol (MeOH), as well as bioelectrochemical nutrient recovery from industrial wastewaters. [For additional information](#)

Project Information

VIVALDI
Grant agreement ID: 101000441

DOI
10.3030/101000441

Start date
1 June 2021

End date
31 May 2025

Funded under
SOCIETAL CHALLENGES - Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy

Total cost
€ 6 969 835,81

EU contribution
€ 6 969 835,81

Coordinated by
UNIVERSITAT AUTONOMA DE BARCELONA
Spain




Advanced chemicals production from biogenic CO₂ emissions for circular bio-based industries

The sustainable conversion of CO₂ to value-added chemicals is considered critical to avoiding catastrophic global warming. Biorefinery industries can lead the way. In this context, the EU-funded CO₂SMOS project will develop a platform of technologies to transform CO₂ emissions produced by bio-based industries into a set of high value-added chemicals with direct use as intermediates for bio-based products. Specifically, it will create a toolbox combining intensified chemical conversions (electrocatalytic and membrane reactors) and innovative biotechnological solutions based on gas/liquid combined fermentation processes and organic/green-catalysts reaction processes. The CO₂SMOS will contribute to the sustainability and cost competitiveness of the integrated conversion processes. [For additional information](#)

Project Information

CO₂SMOS
Grant agreement ID: 101000790

DOI
10.3030/101000790

Start date
1 May 2021


End date
30 April 2025

Funded under
SOCIETAL CHALLENGES - Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy

Total cost
€ 6 918 240

EU contribution
€ 6 918 240

Coordinated by
FUNDACION CARTIF
Spain



Innovative industrial transformation of the steel and chemical industries of Europe

Urea is widely used as a nitrogen-release fertiliser in agriculture but also in many industrial sectors. The EU-funded INITIATE project advances an innovative symbiotic process to generate urea NH₃ from steel residual gases. This innovation will considerably reduce primary energy intensity, carbon footprint, raw material intensity and waste production. The project relies on a consortium consisting of the full value chain, including major steel and urea industries, multidisciplinary researchers, functional material suppliers and experienced promoters of symbiosis issues. It will develop a commercial implementation roadmap to ensure commercial production and implementation of the system and similar symbiotic systems. The reliability of the process will be assessed and validated on a regional and European level by advanced dynamic modelling and life-cycle assessment in line with ISO 14404 guidelines. [For additional information](#)

Project Information

INITIATE
Grant agreement ID: 958318

DOI
10.3030/958318

Start date
1 November 2020

End date
31 October 2025

Funded under
INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Advanced manufacturing and processing

Total cost
€ 23 148 265,86

EU contribution
€ 21 296 571

Coordinated by
NEDERLANDSE ORGANISATIE VOOR TOEGEPAST
NATUURWETENSCHAPPELIJK ONDERZOEK TNO
Netherlands





CCUS ONGOING PROJECTS - INNOVATION FUND

K6 Program

The project will deploy a first-of-its-kind industrial-scale combination of an oxy-fuel kiln and carbon capture technology. The captured CO₂, otherwise emitted to the atmosphere, will be finally stored in a permanent storage site in the North Sea (although this part of the technology chain falls outside the Innovation Fund project boundary, the storage location will most probably be located in Western Norway). The project will result in the avoidance of 8.1 Mt CO₂e emissions over its first ten years of operation. The integration of the K6 Program project with the nearby Port of Dunkirk will foster the development of the port as a future European CO₂ hub. [For more information](#)

Project information

Acronym	Project ID
K6	101051358
Start date	End date
01 April 2022	31 December 2037
Coordinated by	
EQIOM 	
Funded under	
Innovation Fund (InnovFund)	

AGGREGACO2

AGGREGACO2 project targets the aggregates industry for a revolution through the successful commercial deployment of a sustainable aggregate as a solid alternative of conventional aggregates not fully environment-friendly. The AGGREGACO2 proposes a FOAK innovation through the introduction of CO₂ captured of refinery processes in an Accelerated Carbonation Technology (ACT), that revalorise Air Pollution Control residues (APCr), which are hazardous residue nowadays stored after treatment, for the fabrication of carbon negative aggregates. [For more information](#)

Project information

Acronym	Project ID
AGGREGACO2	101038931
Start date	End date
01 April 2021	31 December 2027
Coordinated by	
PETROLEOS DEL NORTE SA 	
Funded under	
Innovation Fund (InnovFund)	



Kairos-at-C

The main objective of the Kairos@C project is to create the first and largest cross-border carbon capture and storage (CCS) value chain to capture, liquefy, ship and permanently store CO₂. Located in the Port of Antwerp, Kairos@C will establish a regional hub for innovative energy and carbon value chains. Kairos@C will develop a full industrial-scale CCS project that will encompass the CO₂ capture from various industrial sources on the Zandvliet industrial platform, the CO₂ transport by pipeline to the liquefaction and export terminal located in the same port, the shipping towards CO₂ subsea storages in the North Sea and the permanent sequestration of the CO₂ in these storages. [For more information](#)


Project information

Acronym	Project ID
Kairos-at-C	101051344
Start date	End date
01 November 2020	31 July 2035
Coordinated by	
AIR LIQUIDE LARGE INDUSTRY 	
Funded under	
Innovation Fund (InnovFund)	

Beccs Stockholm

The Beccs Stockholm project will create a world-class, full-scale Bio-Energy Carbon Capture and Storage (BECCS) facility at its existing heat and power biomass plant in Stockholm. The project will combine CO₂ capture with heat recovery, making the process much more energy-efficient than the process in a usual CCS plant. It will capture and permanently store large quantities of CO₂ from biological sources, leading to carbon removals from the atmosphere, also called negative emissions. [For more information](#)


Project information

Acronym	Project ID
Beccs Stockholm	101051202
Start date	End date
01 July 2021	31 August 2036
Coordinated by	
STOCKHOLM EXERGI AB 	
Funded under	
Innovation Fund (InnovFund)	

Project Syverstone

Project Silverstone offers permanent CO₂ capture and mineral storage (CCMS) through a safer and more economical technology than provided by alternative Carbon Capture and Storage (CCS) solutions. The Carbfix technology imitates and accelerates geological processes that nature has applied for millions of years to regulate long-term CO₂ levels in the atmosphere, turning CO₂ into solid carbonate minerals underground. The project will deploy full-scale CCMS at one of the largest geothermal power plants in the world, reaching a near-zero carbon footprint. The technology is proven at the project site to be safe, efficient, and environmentally friendly [For more information](#)

Project information


Acronym	Project ID
Silverstone	101038888
Start date	End date
01 December 2021	31 December 2030
Coordinated by	
CARBFIX OHF 	
Funded under	
Innovation Fund (InnovFund)	



CCGeo (Closed Carbon Geothermal Energy)

Continental Croatia has vast geothermal potential; however, only a negligible share of it is exploited for energy generation. The proposed Project, located in north-west Croatia, aims to make a difference in the geothermal sector and support Croatia on an energy transition pathway. The objective of the Project is to implement one line for the production of power and heat from the gas dissolved in the geothermal water using the internalization of carbon compounds. The proposed Action is a part of a fully planned advanced geothermal power plant using the internalization of carbon compounds (ICC), which would result in nearly zero GHG emissions throughout the Project lifetime and add to the net-carbon removal efforts. [For more information](#)

Project information

Acronym	Project ID
CCGeo	101038843
Start date	End date
01 January 2022	31 March 2026
Coordinated by	
AAT GEOTHERMAE DOO 	
Funded under	
Innovation Fund (InnovFund)	

SHARC

The SHARC (Sustainable Hydrogen and Recovery of Carbon) project will reduce emissions at the Porvoo oil refinery in Finland, by moving away from the production of grey (fossil-fuel based) hydrogen towards both green hydrogen production (through the introduction of electrolysis facilities) and blue hydrogen production (by applying carbon capture technology). Combined with the offshore storage of carbon dioxide (CO₂), this project will maximize the environmental impact and development of a strong supply chain covering the oil refinery, the CO₂ capture and transport facilities and the storage site. It will also lay the foundation for a European hub for renewable hydrogen and CO₂ utilization. [For more information](#)

Project information

Acronym	Project ID
SHARC	101051125
Start date	End date
01 March 2022	31 July 2035
Coordinated by	
NESTE OYJ 	
Funded under	
Innovation Fund (InnovFund)	



UPCOMING EVENTS

European E-Fuels Conference 2023

8th & 9th of November 2023 in Dusseldorf.

Please find more info on registration [here](#).

The 2023 edition of the conference will once again bring together key industry stakeholders from the renewables, fuels, energy and oil & gas industries: including car manufacturers, e-fuel producers, technology providers, consultants and policy advisors. Senior-level speakers will present on technical aspects of the e-fuel market and present the latest challenges and opportunities that the industry brings. They will discuss topics requested by industry experts, touching on aspects such as e-fuels in the automotive and aviation industry, e-fuel production costs challenges and the latest technological advances amongst others.



2nd “From Production to Application: The P2X Conference”

14/15 November 2023, Frankfurt, Germany

Please find more info on registration [here](#).

The first edition of the conference last year already proved that specifically addresses the practical and technical challenges that arise along the P2X value chain and thus clearly stands out from other offerings in the segment. The P2X market is developing rapidly and information exchange and sharing, networking and collaboration between experts is exactly what is needed now.



Industry CCUS Conference 2023

29-30 November 2023 in Rotterdam, Netherlands.

Please find more info on registration [here](#).

Key topics:

EU policies: the future of Fit-for-55, CAPEX & OPEX of CO₂ usage in various industries, CCUS for reducing costs, Technological advancements for carbon utilization in end-user production, Refining combinations or possibilities to store, CO₂ with systems providing security of storage, CO₂ in E-fuels production, Creating negative emissions markets of the future across industries, Strengthening CO₂ potential as raw material, And many more....



3rd Annual CCUS & Carbon Sinks 2024

22-23 January 2024 in Amsterdam, Netherlands..

Please find more info on registration [here](#).

3rd Annual CCUS 2023 provides an opportunity for collaboration and knowledge sharing in the industry. It prepares a unified and practical strategy for developing and implementing CCUS techniques in the energy sector. Furthermore, it will discuss the perspectives on the status of the CCUS development and its potential. It welcomes key market players to join the discussion and peer-to-peer networking with an exclusive group of experts to share their thoughts on the current CCUS status and its development potential in the near future.



Bio360 Expo 2024

24-25 January 2024 in Nantes, France.

Please find more info on registration [here](#).

Bio360 Expo isn't just a trade show; it's a platform for innovation, connection, and transformation. With a focus on expo renewable carbon, bioenergy, and bioeconomy, our event is where potential turns into progress. Explore cutting-edge technologies, discover new horizons, and immerse yourself in the world of renewable solutions that are revolutionizing industries and reshaping our world. Be a part of the sustainable future - jump aboard today.

**CO2-based Fuels and Chemicals Conference 2024**

17-18 April 2024 Maternushaus, Cologne (Germany), hybrid event.

Please find more info on registration [here](#).

The CO2-based Fuels and Chemicals Conference is one of internationally established and has developed into a unique meeting and networking place for the entire Carbon Capture and Utilisation (CCU) and Power-to-X industry and its customers. The upcoming 12th edition of this conference again will continue with this success and will showcase again the newest and most important developments in the fast growing field of CO2 capture and utilization.

**INTERESTING SITES**

PYROCO2 Project - <https://www.pyroco2.eu/>

CO2 Value Europe - <https://www.co2value.eu/>

CO2 Value Europe database - <https://database.co2value.eu/>

Club CO2 - <https://www.club-co2.fr/fr>

International Energy Agency - <https://www.iea.org/>

Zero Emission Platform - <https://zeroemissionsplatform.eu/>

Strategy CCUS - <https://www.strategyccus.eu/>

Global CCS Institute - <https://www.globalccsinstitute.com>

France Hydrogen - <https://www.france-hydrogene.org/>

GreenH2Atlantic Project - <https://www.greenh2atlantic.com/>

