



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

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FOREWORD

We are delighted to release the sixth strategic intelligence bulletin.

In this sixth edition, we would like to highlight the progress in European legislation related the CCU (in the context of the package Fit for 55). We have noticed a greater interest from companies in searching for projects and funding opportunities related to CCU. This interest is mainly due to the progress of some topics of the Fit for 55 package. Among the measures taken in this package, we can mention the fact that the Council and the European Parliament reached a provisional political agreement on a proposal aiming to decarbonise the aviation sector and create a level playing field for a sustainable air transport (ReFuelEU aviation initiative). Thus, the regulatory landscape starts to become clearer which helps companies to project themselves in the long term regarding their CCU investments .

In order to create better conditions for these projects to be carried out, the development of a CCU roadmap in the member countries of the European Union is essential. A European roadmap is being discussed and finalized.

The infographic below shows the rate of growth of sustainable aviation fuels over the years (according to the new changes on Fit for 55 - ReFuelEU aviation initiative)

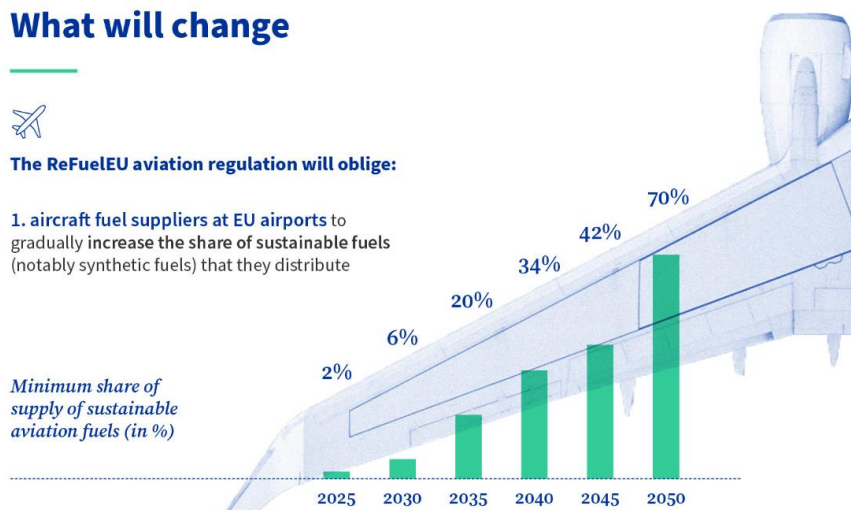
What will change



The ReFuelEU aviation regulation will oblige:

1. aircraft fuel suppliers at EU airports to gradually increase the share of sustainable fuels (notably synthetic fuels) that they distribute

Minimum share of supply of sustainable aviation fuels (in %)



Detailed information is presented in the chapter 'EU polices and legislations'

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 marcos.versiani@axelera.org

Have a good read!



MARKET INFORMATION

The world needs to capture, use, and store gigatons of CO₂: Where and how?

McKinsey & Company, April 2023

Countries and companies around the globe are committing to net zero by 2050. One suite of technologies—collectively called carbon capture, utilization, and storage (CCUS)—offers solutions for many hard-to-abate sectors such as aviation, cement, and hydrogen production from fossil fuels. However, global CCUS uptake needs to expand 120 times from current levels by 2050, rising to at least 4.2 gigatons per annum (GTPA) of CO₂ captured, for countries to achieve their net-zero commitments. This article explores potential CCUS hubs, five emerging hub archetypes, and three key steps to accelerate the development of CCUS hubs. [For more information](#)

Aviation: Hydrogen takes its place in synthetic fuels

H2 Mobile, May 2023

Between the European Commission's initial proposal and the European Parliament's heavier vision, the new roadmap that has just been adopted to decarbonize aviation calls for a 70% share of sustainable fuels by 2050, half of which will be synthetic fuels. Hydrogen has a place in both of these categories. [For more information](#)

Carbon capture and utilization: More than hiding CO₂ for some time

Mertens, Jan, Breyer, Christian, Arning, Katrin, Bardow, André, Belmans, Ronnie, Dibenedetto, Angela, Erkman, Suren, Griepkoven, Jim, Léonard, Grégoire, Nizou, Sylvain, Pant, Deepak, Reis-Machado, Ana S., Styring, Peter, Vente, Jaap, Webber, Michael, Sapart, Célia J. February 2023

This paper, led by Jan Merten, Chief Science Officer with the contribution of Jim Griepkoven clarifies some of the myths related to CO₂ utilisation and highlights some important facts about CCU technologies with a focus on synthetic fuels which refers to creating fuels from renewable energy, water and carbon dioxide. These myths also exist at the level of public opinion and influence the general socio-political acceptance of CCU technologies. [For more information](#)

Best CO₂ Utilisation 2023” Innovation Award – Three winning CCU solutions open the road to transition away from fossil resources

Nova-Institut GmbH, April 2023

More than 245 participants from 30 countries across the world attended the Innovation Award ceremony at the Conference on CO₂-based Fuels and Chemicals 2023 in Cologne, Germany and online. The conference is one of the most established worldwide events on CCU for the entire Power-to-X industry and its customers. This year's 11 th edition showcases the latest and most important developments in the fast-growing field of CO₂ capture and utilisation. During the ceremony, six



nominees had the opportunity to present their innovative CCU solutions to a broad audience of international experts, while nearly 200 people selected the three winners of the innovation award in an audience live voting. From materials that improve carbon capture to the production of proteins and CO₂-based building materials, the three winning CCU innovations open the road to transition away from fossil resources. [For more information](#)

How new business models are boosting momentum on CCUS

IEA , March 2023

2022 was a strong year for carbon capture, utilisation, and storage (CCUS). More than 140 new projects were announced, increasing planned storage capacity by 80%, and capture capacity by 30%. CCUS projects were announced in seven additional countries, in central and southern Europe, the Middle East, and Southeast Asia, bringing the total number of countries with plans to develop CCUS to 45.

Around 15 final investment decisions were taken across applications in industry, power, fuel transformation and direct air capture since the beginning of 2022, up from eight in 2021. This signals an increasing confidence in the industry, driven in part by CCUS-specific policy incentives in the United States, Canada, and the United Kingdom; by strengthened climate pledges; and by rising carbon prices in compliance and voluntary carbon markets. [For more information](#)

JPMorgan to invest over \$200 million in emerging carbon removal technologies

Tech Startups – March 2023

As part of its effort to further accelerate its operational sustainability goals, JPMorgan Chase joined a group of tech companies including Autodesk, H&M Group, and Workday in buying \$1 billion worth of carbon dioxide removal. At the time, the five companies announced a combined \$100 million commitment to Frontier, a benefit company owned by fintech and payment giant Stripe. The \$100 million was in addition to the \$925 million from Stripe, Alphabet, McKinsey, Meta, and Shopify at the launch of Frontier a year earlier. [For more information](#)

France 2030 | Announcement of the industrial port zones of Dunkirk and Fos sur Mer, winners of the Call for proposal "low carbon industrial zones" (ZIBAC)

French Government , January 2023

Roland Lescure, Minister Delegate in charge of Industry, announces the industrial port areas of Dunkirk and Fos sur Mer as winners of the call for projects "low-carbon industrial zones" (ZIBAC), in the framework of France 2030. On November 8, 2022, the French President set a goal of halving French industrial emissions over the next decade. To reach this goal, ecological planning is a new and indispensable method, in order to bring together the efforts required of industry and the deployment in the regions of the technological solutions necessary for the ecological transition: hydrogen, carbon capture, renewable heat, low-carbon electricity. [For more information](#)



The Potential of E-fuels to Decarbonise Ships and Aircraft

International transport forum, January 2023

This report examines the potential of electrofuels (e-fuels) to decarbonise long-haul aviation and maritime shipping. E-fuels like hydrogen, ammonia, e-methanol or e-kerosene can be produced from renewable energy and feedstocks and are more economical to deploy in these two modes than direct electrification. The analysis evaluates the challenges and opportunities related to e-fuel production technologies and feedstock options to identify priorities for making e-fuels cheaper and maximising emissions cuts. The research also explores operational requirements for the two sectors to deploy e-fuels and how governments can assist in adopting low-carbon fuels. [For more information](#)

Trends and Innovations in CO₂ Utilization

Patsnap , January 2023

Carbon dioxide (CO₂) is one of the most significant contributors to global warming, and reducing its concentration in the atmosphere is essential for mitigating climate change. CO₂ utilization is emerging as a critical technology for addressing climate change and promoting sustainability. By converting carbon dioxide into valuable products, CO₂ utilization can help reduce greenhouse gas emissions while also creating economic and environmental benefits. In this article, it is explored the latest trends and innovations in CO₂ utilization. [For more information](#)

Smart Carbon Capture and Utilisation (CCU) Technologies and Materials Defossilise the Economy

Renewable Carbon News, May 2023

With a current capacity of over 1.3 million tonnes for CO₂-based products and steadily growing demand, smart Carbon Capture and Utilisation (CCU) technologies are helping to establish CO₂ as a renewable carbon feedstock. Many of these innovations have been introduced at the Conference on CO₂-based Fuels and Chemicals 2023. [For more information](#)



TECHNOLOGY WATCH

Briefing note on electrofuels

Work Group E-fuels EVOLEN, February 2023.

In 2023, the EVOLEN Working Group will focus on the large-scale industrialization of e-fuels, the deployment of production, import, transport, storage and distribution infrastructures. It will also work on business models and returns along the value chain, on life cycles and carbon footprint, as well as on the cost reduction that is essential for this sector to develop. E-fuels will create new economic sectors, not only for their production, but also for the management and generation of "inputs": renewable or low-carbon electricity, renewable and low-carbon hydrogen, capture, transport, storage, recovery and use of CO₂. The report below represents the results of the first part of discussions.

[For more information](#)

Global demand analysis for carbon dioxide as raw material from key industrial sources and direct air capture to produce renewable electricity-based fuels and chemicals

Journal of Cleaner Production, 2022.

Abstract: Defossilisation of the current fossil fuels dominated global energy system is one of the key goals in the upcoming decades to mitigate climate change. Sharp reduction in the costs of solar photovoltaics, wind power, and battery technologies enables a rapid transition of the power and some segments of the transport sectors to sustainable energy resources. However, renewable electricity-based fuels and chemicals are required for the defossilisation of hard-to-abate segments of transport and industry. The global demand for carbon dioxide as raw material for the production of e-fuels and e-chemicals during a global energy transition to 100% renewable energy is analysed in this research. Carbon dioxide capture and utilisation potentials from key industrial point sources, including cement mills, pulp and paper mills, and waste incinerators, are evaluated. According to this study's estimates, the demand for carbon dioxide increases from 0.6 in 2030 to 6.1 gigatonnes in 2050. Key industrial point sources can potentially supply 2.1 gigatonnes of carbon dioxide and thus meet the majority of the demand in the 2030s. By 2050, however, direct air capture is expected to supply the majority of the demand, contributing 3.8 gigatonnes of carbon dioxide annually. Sustainable and unavoidable industrial point sources and direct air capture are vital technologies which may help the world to achieve ambitious climate goals. [For more information](#)

[For more information](#)

A climate-optimal supply chain for CO₂ capture, utilization, and storage by mineralization

Journal of cleaner production, 2022

Abstract: CO₂ mineralization not only captures and stores CO₂ permanently but also yields value-added products utilized in, for example, the cement industry. CO₂ mineralization has been shown to potentially substantially reduce greenhouse gas (GHG) emissions. Realizing CO₂ mineralization's



potential on a large scale requires a) solid feedstock, b) CO₂ sources, c) low-carbon energy, and d) markets for mineralization products. In general, these four requirements of CO₂ mineralization are not satisfied at the same location. Thus, the assessment of CO₂ mineralization's large-scale potential necessitates the full supply chain considering all requirements for CO₂ mineralization simultaneously. At present, neither the potential of CO₂ mineralization for GHG emissions reduction on a large scale nor the required supply chain to achieve the potential are fully understood. In our study, we design a climate-optimal supply chain for CO₂ capture, utilization, and storage (CCUS) by CO₂ mineralization to quantify the large-scale potential of CO₂ mineralization in Europe. Our results show that a climate-optimal CCUS by CO₂ mineralization could avoid up to 130 Mt CO₂e/year of the industrial emissions in Europe even with the current energy supply system. By 2040, CCUS by CO₂ mineralization could provide negative emissions of up to 136 Mt CO₂e/year. The required energy and CO₂ for the CCUS supply chain can be provided either by expanding the current infrastructure by about 5 % or, even more climate efficiently, by building new infrastructure. The critical steps toward achieving the large potential of CO₂ mineralization in Europe are 1) scaling up the CO₂ mineralization technology to the industrial level and 2) exploiting large-scale mineral deposits. [For more information](#)

ROADMAP for decarbonation of air transport, France

Eurogroup Consulting, March 2023

Air transport will play its full part in the decarbonization process that is essential in all areas of human activity. Over the past few decades, the air transport industry has been able to simultaneously technological and operational developments towards safer, but also more affordable air transport, thanks to more affordable, to more competitive and energy-efficient products. Faced with the climate emergency we must now move towards a new revolution, that of decarbonization, by mobilizing all the sector's capacities to achieve carbon neutrality. The ICAO Assembly in October 2022 set the "aspirational" goal of carbon neutrality by 2050, which was agreed upon by the entire industry. 2050, agreed by all member countries. This is in line with the Toulouse Declaration of the Aviation Summit organized by France during the French presidency of the European Union, and is now global in scope. Following the commitments made at the European level, but also by many major aviation countries this will allow us to combine the efforts of all, private players and States, to make the transition to a transition to sustainable air transport. France has all the assets to be at the forefront of a proactive and ambitious approach, with leading industrialists and operators, as well as a major advantage: a capacity for government-industry dialogue at the highest level. [For more information](#)

The chemical engineering aspects of CO₂ capture, combined with its utilization

Elsevier, May 2023

CO₂ carbon capture and utilisation (CCU) technologies are discussed from the chemical engineering perspective of their role in a future low-carbon scenario. It is highlighted that current techno-economic assessment procedures have limits in predicting the role of CCU technologies. There is a



need to pass from current 1st-generation power-to-X technologies to synthesise e-fuels to the 2nd-generation solar fuel technologies. The hard-to-abate sector, particularly steel and cement production, is also shortly analysed, remarking on the necessity to overcome current approaches starting from analysing the critical aspects limiting feasibility and economics. [For more information](#)

Trade-offs between Sustainable Development Goals in carbon capture and utilisation

Royal Society of Chemistry, September 2022

Abstract: Carbon capture and utilisation (CCU) provides an appealing framework to turn carbon emissions into valuable fuels and chemicals. However, given the vast energy required to activate the CO₂ molecule, CCU may have implications on sustainable development that are still poorly understood due to the narrow scope of current carbon footprint-oriented assessments lacking absolute sustainability thresholds. To bridge this gap, we developed a power-chemicals nexus model to look into the future and understand how we could produce 22 net-zero bulk chemicals of crucial importance in a sustainable manner by integrating fossil, CCU routes and power technologies, often assessed separately. It was evaluated the environmental performance of these technologies in terms of their contribution to 5 Sustainable Development Goals (SDGs), using 16 life cycle assessment metrics and 9 planetary boundaries (PB) to quantify and interpret the impact values. [For more information](#)

Carbon Capture Utilisation and Storage in Extractive Industries for Methanol Production

MDPI, January 2023

Abstract The elevated increase of CO₂ emissions related to activities of the extractive industry is becoming a challenging issue gradually affecting climate change and global warming. In this frame, the effective utilisation of CO₂ through the techniques of Carbon Capture and Storage (CCS) as well as Carbon Capture and Utilisation (CCU) can alleviate the greenhouse effect. Converting CO₂ into a value-added chemical or liquid fuel (e.g., methanol, hydrocarbons, propylene, dimethyl ether, ethylene, etc.) is a promising approach in this regard. Methanol (MeOH) synthesis offers a key feedstock for industries, being both an industrial commodity for several chemical products and an efficient transportation fuel. This article presents a review of the CCS and CCU technologies for the production of MeOH in extractive industries. The CCS technologies investigated in this framework are the amine-based absorption and the WGS-enhanced CCS. The CCU technologies are CO₂ hydrogenation and enhanced CO₂ transformation by the Fischer-Tropsch reaction. Incorporating these systems for the processing of the flue-gases of the extractive industries significantly reduces the CO₂ emissions, while creating new revenues by the production of valuable MeOH. [For more information](#)

Microalgal (CO₂) Capture and Utilization from the European Union Perspective

MDPI, January 2023



Department of Energy and Process Engineering, Norwegian University of Science and Technology, January 2023

Abstract: 'The increasing concentration of anthropogenic CO₂ in the atmosphere is causing a global environmental crisis, forcing significant reductions in emissions. Among the existing CO₂ capture technologies, microalgae-guided sequestration is seen as one of the more promising and sustainable solutions. The present review article compares CO₂ emissions in the EU with other global economies, and outlines EU's climate policy together with current and proposed EU climate regulations. Furthermore, it summarizes the current state of knowledge on controlled microalgal cultures, indicates the importance of CO₂ phycoremediation methods, and assesses the importance of microalgae-based systems for long-term storage and utilization of CO₂. It also outlines how far microalgae technologies within the EU have developed on the quantitative and technological levels, together with prospects for future development. [For more information](#)

Comparative Life Cycle Assessment of Carbon Dioxide Mineralization Using Industrial Waste as Feedstock to Produce Cement Substitutes

MDPI, May 2023

The mineralization of carbon dioxide offers a way to permanently sequester carbon while producing construction materials, combining the concepts of carbon capture and utilization (CCU) and carbon capture and storage (CSS). However, it is important to evaluate different mineralization processes in terms of their environmental impact. This study provides the first comparative life cycle assessment (LCA) analysis that focuses on the utilization of industrial waste materials. We analyzed the climate and material footprint of six mineralization pathways from cradle to gate using steel slag, concrete waste, municipal solid waste incineration (MSWI) ash, and olivine as feedstock. A sensitivity analysis was used to identify the factors with the greatest impact on environmental performance.

[For more information](#)

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

Bartosz Dziejarski, Renata Krzyżyńska, Klas Andersson, January 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. The article is 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, this work aims to guide the further scaling up and establishment of worldwide CO₂ emission reduction projects. [For more information](#)

Scenario assessment of introducing carbon utilization and carbon removal technologies considering future technological transition based on renewable energy and direct air capture
Journal of Cleaner Production, January 2023

Carbon capture and utilization (CCU) and carbon dioxide removal (CDR) technologies have the potential to significantly contribute to GHG reduction. Numerous studies have evaluated the CO₂ reduction effects and economics of CCUs and CDRs; however, uncertainties in these evaluations due to various regional characterizations and future technological transitions are of high importance. In this study, four synthetic fuels (fuels produced from captured CO₂ and H₂), methanol, methane, gasoline, and diesel, were evaluated by life cycle assessment (LCA) and techno-economic assessment (TEA). Five representative countries with different regional characteristics were selected for the study. A bottom-up integrated LCA/TEA approach was used, involving detailed process simulations to avoid uncertainties and to evaluate future technological transitions based on direct air capture (DAC) and renewable energy. [For more information](#)

A State-of-the-Art Review on Technology for Carbon Utilization and Storage
MDPI open access journals, January 2023

Carbon capture utilization and storage (CCUS) technologies are regarded as an economically feasible way to minimize greenhouse gas emissions. In this paper, various aspects of CCUS are reviewed and discussed, including the use of geological sequestration, ocean sequestration and various mineral carbon mineralization with its accelerated carbonization methods. By chemically reacting CO₂ with calcium or magnesium-containing minerals, mineral carbonation technology creates stable carbonate compounds that do not require ongoing liability or monitoring. In addition, using industrial waste residues as a source of carbonate minerals appears as an option because they are less expensive and easily accessible close to CO₂ emitters and have higher reactivity than natural minerals. Among those geological formations for CO₂ storage, carbon microbubbles sequestration provides the economic leak-free option of carbon capture and storage. This paper first presents the advantages and disadvantages of various ways of storing carbon dioxide; then, it proposes a new method of injecting carbon dioxide and industrial waste into underground cavities. [For more information](#)



EU POLICIES & LEGISLATION

Council and Parliament agree to decarbonise the aviation sector

Council of European Union , April 2023

The Council and the European Parliament reached a provisional political agreement on a proposal aiming to decarbonise the aviation sector and create a level playing field for a sustainable air transport (ReFuelEU aviation initiative).

The proposal aims to increase both demand for and supply of sustainable aviation fuels (SAF), while ensuring a level playing field across the EU air transport market. It is a major proposal which aims to put air transport on the trajectory of the EU's climate targets for 2030 and 2050, as SAF are one of the key short- and medium-term tools for decarbonising aviation. It should provide a way out of the situation which is hindering their development: low supply and prices that are still much higher than fossil fuels. [For more information](#)

Building a circular and carbon neutral Europe: the place of carbon recycling in European public policies

Tudy Bernier, November 2022

The European Union (EU) has made the fight against climate change its main objective of the decade: with the continued adoption of the "Fit-for-55" package, the publication of a European communication on restoring sustainable carbon cycles, and the implementation of current European legislation to accelerate the deployment of renewable energies, the EU is giving substance to its framework for action to significantly reduce its greenhouse gas emissions in the coming years. Among the tools mobilized, CO₂ capture and storage (CCS) technologies play an important role in reducing our dependence on fossil fuels and reducing our CO₂ emissions. But is the European legislative framework under construction adapted to the deep and radical transformation of production and consumption patterns in Europe?. [For more information](#)

Fit for 55: Parliament and Council reach deal on greener aviation fuels

European Parliament, April 2023

On Tuesday, Parliament and Council negotiators agreed to increase the uptake of sustainable fuels, such as advanced biofuels or hydrogen, in the aviation sector. A provisional deal, reached on Tuesday night between the European Parliament and Council negotiators on RefuelEU Aviation rules, sets the minimum share of sustainable aviation fuels to be made available at EU airports, to cut emissions and ensure the EU becomes climate neutral by 2050.

MEPs secured an agreement that, starting from 2025, at least 2% of aviation fuels will be green, with this share increasing every five years: 6% in 2030, 20% in 2035, 34% in 2040, 42% in 2045 and 70% in 2050. In addition, a specific proportion of the fuel mix (1.2% in 2030, 2% in 2032, 5% in 2035 and



progressively reaching 35% in 2050) must comprise synthetic fuels like e-kerosen. [For more information](#)

European Green Deal: EU agrees stronger legislation to accelerate the rollout of renewable energy European Commission, March 2023

The Commission welcomes the provisional agreement reached today between the European Parliament and the Council to reinforce the EU Renewable Energy Directive. This deal brings the EU one step closer to completing the “Fit for 55” legislation to deliver the European Green Deal and the REPowerEU objectives. The agreement raises the EU's binding renewable target for 2030 to a minimum of 42.5%, up from the current 32% target and almost doubling the existing share of renewable energy in the EU. Negotiators also agreed that the EU would aim to reach 45% of renewables by 2030. The agreement reaffirms the EU's determination to gain its energy independence through a faster deployment of home-grown renewable energy, and to meet the EU's 55% greenhouse gas emissions reduction target for 2030. A massive scaling-up and speeding-up of renewable energy across power generation, industry, buildings and transport will reduce energy prices over time and decrease the EU's dependence on imported fossil fuels. [For more information](#)

2023 State of the EU ETS Report

Andrei Marcu, Juan Fernando López Hernández, Gabriele Romeo, Emilie Alberola, Anouk Faure, Chimdi Obieniu, Bo Qin, Mariko O'Neill, Jean-Yves Caneill, Stefan Schleicher, April 2023

The State of the EU ETS Report is an independent effort that is not intended to duplicate or replace mandated work undertaken by the European Commission. It focuses on assessing the performance of the EU ETS at the time when the report is produced. This report is intended as a snapshot, providing policymakers and stakeholders with an overview of how the EU ETS is performing by April of each year, based on previous year data. Within the constraints posed by the availability of publicly accessible data, the Report aims to assess whether the EU ETS is ‘fit for purpose’. [For more information](#)

Renewable Energy Directive (RED): EU misses clear investment signals for hydrogen and eFuels E-fuel Alliance, May 2023

The trilogue of the European Parliament, the Commission as well as the Council regarding the Renewable Energy Directive (RED) has come to an end. The legislators agreed on a target of 42.5 % renewable energies in all sectors of the EU by 2030. In the transport sector, emissions must be reduced by 14.5 %. A combined quota of 5.5% advanced biofuels and eFuels will be mandatory in the transport sector by 2030. There is a double multiplier on the 5.5 %, resulting in a real quota of 2.25 %. In addition, a binding sub-quota of one percent, likewise with a multiplier, was adopted for renewable fuels of non-biogenic origin (RFNBOs).
. [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 **23/06/2023**. (then 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: 1st deadline **27/06/2023**; 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](#)

Appel à projets (IBAC) Stratégie d'accélération décarbonation

ADEME

Deadline date: 16/10/2023 (The dates have changed by ADEME)

This call for proposals aims to support projects led by SMEs developing innovative, competitive and sustainable methodologies, technologies, industrial solutions and services in the field of industrial decarbonization. [For more information](#)

Appel à projets (DEMIBAC) Stratégie d'accélération décarbonation

ADEME

Deadline date: 16/10/2023 (The dates have changed by ADEME)



This call aims to support innovation projects led by companies which accelerate in the market the implementation of sustainable technologies and/or solutions to decarbonize industry, from the industrial research phase to the demonstration phase. [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 synergetic 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

Gordon Research Conference (GRC) on Carbon Capture, Utilization and Storage

28 May – June 02, Les diablerets, VD Switzerland

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



Carbon Capture, Utilization and Storage
Gordon Research Conference
May 28 - June 2, 2023, Les Diablerets, VD, Switzerland

This is a premier, international scientific conference focused on advancing the frontiers of science through the presentation of cutting-edge and unpublished research, prioritizing time for discussion after each talk and fostering informal interactions among scientists of all career stages.

Climeworks Direct Air Capture Summit

June 6, Zurich, Switzerland

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



This 4th edition of the summit focuses on advancing high-quality carbon removal solutions. The full-day event will spotlight the science and economics of direct air capture, the roles of corporations and governments in the voluntary carbon market, the importance of environmental justice, and more.

Sustainable Aviation Futures Congress

June 7-9, Amsterdam, Netherlands

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



Sustainable Aviation Futures is a high-level congress establishing the aviation industry's pathway to net zero, and a content-rich networking event that will showcase the latest strategies for decarbonisation, key industry challenges, and exciting opportunities for airlines, corporate organisations, and fuel producers.

20th International Conference on Carbon Dioxide Utilisation

25-29 June in Bari (Italy)

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



For nearly thirty years, the ICCDU has provided a global meeting place for chemists, engineers, and environmental policy planners to come together and discuss the latest developments in the field of CO₂ capture and utilization. The conference covers today a large number of topics spanning from biological fixation, homogeneous and heterogeneous catalysis, electrochemistry, carbonation of waste, hydrated CO₂, Life Cycle Assessment, Integrated Processes, CO₂ enabling/sustainable processes.

DÉPLOIEMENT DU CCU EN FRANCE – OPPORTUNITÉS ET DÉFIS

September 14, Novotel Bron Eurexpo, 260, avenue Jean Monnet
69500 BRON, France

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

The implementation of CCU projects will be an important lever for achieving the 2050 carbon neutrality objectives in France and throughout Europe. Several challenges remain for the implementation and sustainability of these projects. In this context, AXELERA in collaboration with Club CO₂ is organizing the seminar "Deployment of CCU in France - opportunities and challenges" with the objective of bringing together actors interested in this technology, to understand financing opportunities, to learn more about regulatory issues as well as to meet other actors in the value chain.



7th CO₂ Value Days & General Assembly

October 5 - October 6, Barcelone
Spain

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

The event will take stock of the current development of CCU in Europe from a multi-angle approach and discuss future deployment. Policymakers at the European level will be invited to update on the plans of the European Commission for the development of CCU (e.g. through the elaboration of the European Strategy for CCU and CCS expected at the end of 2023), whereas members of the European Parliament will provide insight into specific policy instruments driving the deployment of CCU products.



**7th CO₂ VALUE
DAYS & GENERAL ASSEMBLY**

The European Carbon Dioxide Utilisation Summit

25-26 October 2023 in Hamburg,
Germany.

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

This summit will attract attendees from Energy companies investing in R&D, Oil, gas and chemical companies with Alternative energy departments, Governments looking for investable R&D in the energy sector, Biofuel companies, Power to gas/liquids fuels, Industrial Chemical sector, Start-up technology companies, Chemical product manufacturers, Fuel & Biofuel technology companies, Venture capital firms, Clean energy technology companies, Oil and gas services companies, Gases and engineering companies, Petrochemical consulting companies and more.



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.



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/>

