EnCO$_2$re is enabling CO$_2$ re-use
An open innovation programme
Overview

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Our idea: Closing the carbon loop.
Our vision: A world efficiently re-using CO₂

In a more sustainable future:

• CO₂ is extensively used as feedstock for new or improved products

• Business can trust that know-how (IP) is protected

• Proven technologies for CO₂ re-use allow for smooth production processes

• Companies and consumers demand products made from CO₂

• The industrial carbon loop is nearly circular

• Energy from alternative sources makes CO₂ re-use sustainable

• Europe leads in CO₂ re-use technology and has successfully capitalized on its innovation capacity in terms of jobs and economic growth
Carbon neutral value chains based on the circular economy and the bio-economy are the future foundation of Europe’s industry. Climate-KIC will catalyse the transition to economically viable circular models, by seed-funding high-impact climate solutions and facilitating open innovation through multi-stakeholder and cross-industry collaboration.

Sira Saccani
Director Sustainable Production Systems Climate-KIC, Member of Steering Committee of enCO₂re

Dr. Christoph Sievering
Head of Energy Strategy and Policy, Covestro Chairman of Steering Committee of enCO₂re

Cooperation between industry and science, in addition to active dialogue with society and policymakers, is essential to commercializing breakthrough technologies. Through CO₂ re-use and other innovations, it’s clear that industry can and will be part of the solution to climate change.
If CO$_2$ re-use is part of the future, where are we today?

Strong market needs ...

• 2°C climate target requires **shift from fossil fuels to renewables**

• Major emitters urgently look to manage CO$_2$ footprint

• Producers seek stability through **feedstock diversification**

... and emerging capabilities ...

• **New technologies** offer novel ways to use CO$_2$

• Independent **research and business activities** are scattered across Europe

... offer a commercial opportunity

• A gap exists between **research and market value**

• CO$_2$ re-use could be a **key component of sustainable European growth**
EnCO₂re is the missing link

Enabling CO₂ re-use is our core mission. EnCO₂re: ... is an innovation programme that supports technology and product development

... provides a network of engaged pioneers from industry and research who work together to boost CO₂ re-use

... increases awareness for CO₂ re-use

... ensures sustainability and social acceptance of materials and products by integrated socio-ecological research

... is a multi-annual programme with a long-term perspective

... has the ambition to create a commercially viable value chain from CO₂ emitter to end-user

... is a product of Climate-KIC, Europe’s largest climate innovation initiative.

Innovation Hub
Partner Network
Market Developer
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EnCO\textsubscript{2}re is an open innovation programme between:

**Climate-KIC**, the EU’s main climate innovation initiative
- Primary funder
- Responsible for: programme management, processes, controlling, communications, policy
- Membership of all partners is required

**High-tech polymer company Covestro**
- Co-funder, industrial lead partner
- Focusing on ideation and technical evaluation, technology development, and market linkages

**Expert Partners**
Eleven companies and institutions from seven European countries
- Implementing research and innovation projects with strategic fit to the programme’s direction
- Contributing to shaping the programme

**Management**
Joint partner and project management

**Content**
Current enCO$_2$re partners

EnCO$_2$re partners stand for:

**COMPETENCE**
Know-how in CO$_2$ re-use

**CAPABILITY**
Power to resource the programme and projects

**ENGAGEMENT**
Ambition to contribute to a more sustainable future

- Bayer Technology Services, Germany
- CHALMERS University of Technology, Sweden
- Covestro, Germany
- Imperial College London, Great Britain
- Johanneberg Science Park, Sweden
- ENGIE Lab, Belgium
- Mines ParisTech, France
- RWTH Aachen University, Germany
- TU Delft, Netherlands
- University of Copenhagen, Denmark
- Wuppertal Institut für Klima, Umwelt, Energie GmbH, Germany

EnCO$_2$re is a flagship programme of Climate-KIC
EnCO\textsubscript{2}re projects span four initial categories

- **CO\textsubscript{2} value chains**
  - Bringing together CO\textsubscript{2} emitters, processors and end-users

- **CO\textsubscript{2}-based intermediates & polymers**
  - Development of intermediates and polymers using CO\textsubscript{2} as a feedstock

- **Sustainability analysis for CO\textsubscript{2} re-use**
  - Analysis of ecological effectiveness, as well as social acceptance

- **Business & market development for CO\textsubscript{2} re-use**
  - Development of the market to make the business case for CO\textsubscript{2} re-use

Additional project categories will be considered as the programme grows.
Programme management provides a solid framework for project delivery

**Process Management**
Ensure smooth collaboration and reliability

**Ideation & Scouting**
Find the most promising new ideas for the programme

**Ecosystem Building**
Attract programme partners and link the programme to other stakeholders

**Communication**
Raising awareness, showcasing successes and making knowledge publicly accessible

**Matchmaking**
Actively connecting people corresponding to their interests and projects
Governance and key figures

FLAGSHIP SPONSOR BOARD

Meet once a year; accountable for overall budget, funding strategy, and progress in relation to a multi-annual plan.

STEERING COMMITTEE

Meets quarterly; responsible for strategic direction and serves as the programme’s decision body.

FLAGSHIP DELIVERY TEAM

Delivers results and ensures operational success.

PROJECTS

Programme management

Supporting activities

Project intake throughout the year

€3+ Million annual budget

Multi-annual programme started in 2014 with public launch in 2016
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EnCO$_2$re has a rigorous project-selection process

1. Ideation & scouting
   - Call for ideas
   - Ideation events
   - Follow-up on existing projects
   - Request by programme management
   - One-off opportunities

2. Simple one-pager

3. Efficient early review process

4. Full proposal

5. Pre-evaluation by programme management

6. Submission for Steering Committee decision

7. Decision by Steering Committee (4 times a year)
Our current project portfolio

**CO₂ value chains**
- Value chains for CO₂ re-use
- Geographic case studies

**CO₂-based intermediates & polymers**
- Ring opening polymerization
- CroCO₂PETs
- Catalysts for CO₂-polymerization
- Electrochemical conversion

**Sustainability analysis for CO₂ re-use**
- Life cycle assessment
- Public perception and technology acceptance
- Rapid prototyping
- LCA study on CO₂-based C1 building blocks

**Business & market development for CO₂ re-use**
- Commercialization and incubation
- Policy analysis
Why join the programme?

**Network**
Foster relationships with other CO₂ re-use pioneers

**Visibility**
Be part of a European success story

**Holistic view**
Not just R&D but all relevant dimensions of CO₂ re-use covered

**Participate**
Actively shape the programme

**Matchmaking**
Find the right partners for your projects

**Knowledge**
Stay current with the latest developments in the CO₂ re-use landscape

**Confidentiality**
Have dialogue and do projects in a safe forum

**Project support**
Get a robust framework and financial support for your projects

EnCO₂re is a flagship programme of Climate-KIC
Example output: Connecting the dots

We know how to pinpoint useful sources of CO$_2$.

We know who is engaged in CO$_2$ re-use – across Europe and worldwide.

We use data to bring people together and thus create new connections.

CO$_2$ emissions
- Moderate purity
- High purity
(Selected data from project “Value Chains for CO$_2$ re-use” led by Imperial College)

CO$_2$ re-use players
(Selected data from project “Commercial Analysis and Rapid Prototyping” led by TU Berlin)
Be a part of enCO₂re!

Do you have projects that can deepen or broaden our capabilities?

Are you interested in connecting with other players in this field?

Do you plan to start an engagement in CO₂ re-use?

Do you want to have discussions on an expert level with peers?

Get in touch with us.
http://enCO2re.climate-kic.org
Your primary enCO₂re contacts

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„Überall geht ein frühes Ahnen dem späteren Wissen voraus. “

(Later knowledge is always preceded by an early instinctive idea)

Alexander von Humboldt (1769 – 1859)
Climate-KIC is the EU’s largest public-private partnership addressing climate change through innovation.

**Activities:**
- Contribution to building a carbon-neutral economy.
- Engagement in education to inspire and empower the next generation of climate leaders.
- Programmes for students, start-ups and innovators across Europe.

**Focus:**
- Improving the way people live in cities.
- Focus on industry creating products needed for a better living environment.
- Optimization of land use and food production.
- Informing systemic decision-making benefitting climate protection by climate finance and metrics.

Climate-KIC is supported by the European Institute of Innovation and Technology (EIT), a body of the European Union.