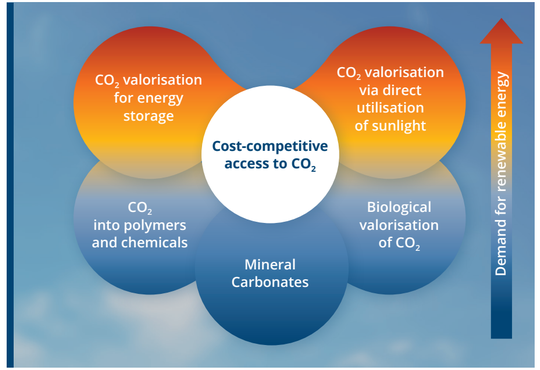
The technical scope of the PHOENIX initiative includes five elements that can contribute to a more sustainable production of chemicals, materials, fuels, biomass and can provide means to store renewable energy. Cost-competitive access to CO_2 is a cross-cutting element (illustrated below).

Fig. 2 PHOENIX initiative technical areas



It is the ambition of PHOENIX to build the future of CO_2 valorisation on a European scale, collaborating across national borders. PHOENIX will strive for joint progress, but recognises that policies will vary from country to country or region to region. In striving for progress, PHOENIX will make optimal use of national, regional and European instruments.

For further information:
www.phoenix-co2-valorisation.eu

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE

Federal Ministry of Education and Research

Netherlands Enterprise Agency

cefic

PHOENIX INITIATIVE

A EUROPEAN INTEGRATED APPROACH TO CO_2 VALORISATION

The PHOENIX Initiative is a collaborative effort supported by EU Member States (France, Germany and the Netherlands) and the European Chemical Industry Council (Cefic). PHOENIX will function as an umbrella initiative linking national and European Research, Development and Innovation (RD&I) activities with respect to CO_2 valorisation to ensure an optimal use of public funding and private investment. PHOENIX will interact with all relevant stakeholders from industry through research institutions to national governments and the European Commission.

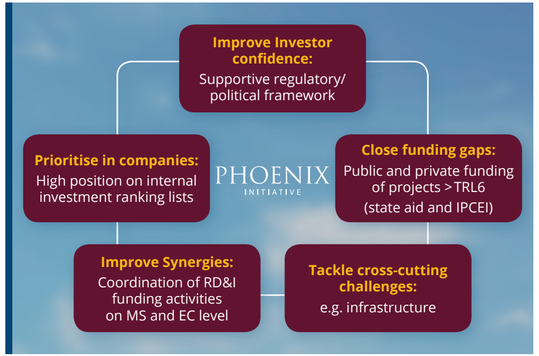
PHOENIX – A European integrated approach on CO_2 valorisation to succeed

The PHOENIX initiative aims to develop a European integrated approach to ensure that CO_2 valorisation technology developments can be transformed into real benefits for Europe.

Because CO_2 valorisation is a recent field and is not limited to one industry area, the deployment of technologies in and from Europe entails high investment that comes with high risks. For successful deployment, methods for risk-sharing and an appropriate policy framework are necessary.

The described challenges of such disruptive technologies are faced by all stakeholders: industry, Member States, the European Commission and others. In order to ensure appropriate investment in development and deployment the challenges have to be tackled together as part of an integrated approach as envisioned by the PHOENIX initiative (illustrated below).

Fig. 1 Objectives of the PHOENIX initiative



CO_2 valorisation
What can be achieved?

Why CO_2 valorisation?

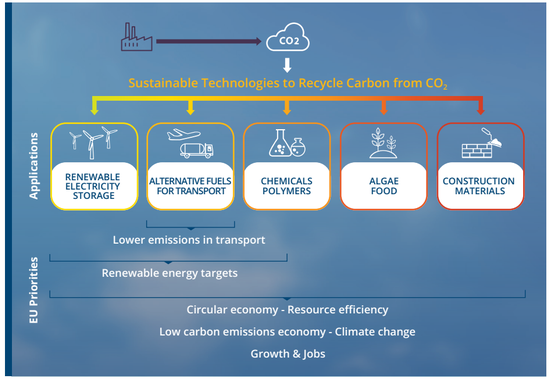
- Carbon is a crucial part of a wide variety of products – from food to materials – all essential to society.
- Alternative carbon sources and production pathways need to be considered for more sustainable production in and from Europe.
- CO_2 sources are abundant and available in Europe.
- Recycling carbon from CO_2 for a more sustainable production of chemicals, materials, fuels and biomass needs to be part of our European strategy towards CO_2 emission reduction in a future circular economy.

CO_2 valorisation can be beneficial for multiple sectors including, chemicals, cement, steel, transport, renewable electricity and horticulture. It can also contribute to Europe's industrial leadership in clean technologies, stimulate growth and pave the way to a more circular low carbon economy.

CO_2 valorisation for a more sustainable production of chemicals, materials, fuels, biomass, and storage of renewable electricity is therefore **part of the portfolio of solutions needed to address major EU priorities and tackle major societal challenges**.

As with any other technology, the environmental impact of CO_2 technologies requires an appropriate evaluation based on a qualified Life Cycle Analysis (LCA). All contributions to the carbon footprint have to be taken into account in order to quantify avoided CO_2 emissions by conversion of CO_2 as an alternative carbon source as compared to conventional production pathways. System boundaries for the evaluation have to be carefully defined for each case. Net CO_2 emissions reduction as proven by LCA will be an important target for the PHOENIX initiative.

Fig. 3 CO_2 valorisation: applications and EU priorities addressed



Challenges for the implementation of CO_2 valorisation technologies in Europe

- High demand for and access to renewable energy for a wide range of technologies
- New business models necessary through industrial symbiosis
- Development of a harmonised and standardised impact assessment
- Alignment of RD&I funding activities across Europe and Member States
- Establishment of a supportive and coherent regulatory and political fra mework

A more appropriate policy framework for sustainable technologies

A sustainability-based approach needed

The European policy framework impacting the deployment of CO_2 valorisation technologies is currently fragmented with policies based on specific types of indicator (e.g. material resource or energy) or categories of products/applications.

It is the belief of the PHOENIX initiative, that the environmental impact of technologies have to be evaluated on an appropriate LCA based approach, which should be the basis for the policy framework. In addition to an appropriate evaluation of the environmental impact, the economical and social aspects of sustainability should also be considered in the evaluation of new technology options. This includes, for example, the benefits from using/building on existing infrastructures and assets.

A coherent policy and regulatory framework

Coherence between the various policies (energy, circular economy, innovation, industry) is essential to enable innovative technologies developed in Europe to contribute fully to a sustainable European economy and address climate protection and resource efficiency issues.

Policy coherence in content and timing, as well as policy stability over time, is essential to establish a regulatory framework that enables investment in sustainable innovative CO_2 valorisation technologies. Uncertainty and extended timelines for policy decisions have negative consequences on the confidence of private and public investments in these new clean technologies. An appropriate, coherent and supportive regulatory framework is an essential element to ensure continuing European leadership towards a low carbon economy including circular concepts.

PHOENIX
How can you get involved?

Additional Member States/Associated countries are invited to join the initiative and interested industry stakeholders are invited to get involved to contribute to designing PHOENIX as a powerful initiative to support the deployment CO_2 valorisation in and from Europe.

Fig. 4 PHOENIX Initiative development