

## Funding CCS in Europe: Key investments for the recovery

**IOGP welcomes the variety of EU proposals for funding instruments as an opportunity to direct public support to energy and low-carbon technologies. Most of these, such as Carbon Capture and Storage (CCS), are key components of the Green Deal and at the heart of the Recovery Package.**

The importance of carbon capture and storage has been recently reconfirmed by the Commission in the Communications on Hydrogen Strategy<sup>1</sup> and on energy System Integration<sup>2</sup>, where their crucial role of technologies to address hard-to-abate emissions in certain industrial processes is stressed and where it is suggested the establishment of a European CCUS Forum.

We believe that public support should concentrate on the innovative, promising and scalable technologies to facilitate industrial-scale carbon management projects. Industry can in fact deliver the scale of projects required to reach the EU climate goals while, as a priority, maintaining existing jobs and stimulating the creation of new ones. This is essential especially in the context of the current COVID-19 crisis.

CCS is a technology providing benefits from a climate perspective by reducing emissions but also from an economic one, by maintaining competitive industries in Europe.

CCS can also compensate residual emissions in other sectors: when applied to sustainable biomass or biogas, CO<sub>2</sub> capture and storage can help to drive negative emissions by removing CO<sub>2</sub> from the atmosphere, making BECCS an important contributor to limiting global warming.

For the reasons outlined above, we urge **the European Parliament and the Council to support Carbon Capture and storage (CCS)** in the upcoming dossier on funding tools, starting with InvestEU.

IOGP members have developed many of the techniques integral to CCS and continue investing in future CCS projects together with other industries (e.g. steel, cement, chemicals) in clusters where emissions will be captured from multiple industrial sources and then stored safely underground.

<sup>1</sup> Commission Communication, July 2020, 'A hydrogen strategy for a climate-neutral Europe' [here](#).

<sup>2</sup> Commission Communication, July 2020, 'Powering a climate-neutral economy: An EU Strategy for Energy System Integration' [here](#).

## CCS: a fundamental climate tool not to be delayed

Several modelling scenarios from the IPCC, International Energy Agency (IEA) together with EU analysis have constantly showcased that CCS is an essential technology for climate mitigation. In particular, the 2018 IPCC SR15<sup>3</sup> Report underlined that reducing emissions alone is no longer enough.

Storing CO<sub>2</sub> under the ground in saline aquifer or depleted oil & gas fields is safe<sup>4</sup>, and Europe is well placed to benefit from CO<sub>2</sub> storage<sup>5</sup>. A recent study<sup>6</sup> highlighted that storing globally no more than 2,700 Gt CO<sub>2</sub> would be sufficient to meet the IPCC targets and that we are on track with this, but this amount will grow if CCS deployment is delayed. In the Commission's 1.5 TECH scenario, around 300 Mtpa CO<sub>2</sub> must be captured and stored by 2050. In Europe, 300 GtCO<sub>2</sub> of storage capacity has been estimated at a high-level. There is also ample storage capacity in southern Europe, e.g. in Spain where probable storage capacity is estimated to be between 12.9 GtCO<sub>2</sub> – 14 GtCO<sub>2</sub>. When storage restrictions are considered, the geological storage potential for CO<sub>2</sub> in the EU, including Norway, is likely to be around 134 GtCO<sub>2</sub> which amounts to 446 years worth of CO<sub>2</sub> storage at a rate of 300Mtp<sup>7</sup>.

CCS technology is also critical for the deployment of low-carbon hydrogen using natural gas in process such as Steam Methane Reforming or Autothermal Methane Reforming (AMR) with CCS at an abatement rate of 94% (total carbon footprint would be around 50g CO<sub>2</sub>/kWh)<sup>8</sup>. This will support the decarbonisation of EU heating, transport, power generation and other emission-intensive sectors such as steel and cement.

From an economic perspective, CCS helps preserve industrial activity in Europe, by helping secure existing industrial jobs and create new employment for the construction, operation and maintenance of CCS facilities, as well as in the supply chain. The SINTEF research institute estimates the deployment of CCS in Europe could provide 150,000 jobs in 2050, of which 60,000 to 70,000 would be indirectly employed in supply chains<sup>9</sup>.

## Which EU funds for CCS projects

European Green Deal Investment Plan is the investment pillar of the Green Deal. This, together with the new instruments under the EU Recovery Package could mobilise at least €1 trillion in sustainable investments over the next decade to fund the green transition. These cover funds in the EU Budget, Just Transition Mechanism, InvestEU instrument (including contribution from the European Investment Bank) and co-financing from Member States under different programmes and instruments. It is key that CCS will be an integral part of this funding opportunities.

Improved EU funding instruments are being designed to support CCS projects. For instance, the Innovation Fund<sup>10</sup> will be one of the largest funding instruments in the world for demonstration of innovative low-carbon technologies. Compared to its predecessor, the NER300, it is much more flexible: it improves the risk-sharing for projects, as its grants cover up to 60% of the additional capital and operational costs of innovation; the cash flow of the project is ensured through pre-defined milestones; it has simplified processes and allows synergies with other EU funding programmes.

This positive trend should continue and all relevant EU funding instruments for both private investors and Member States should offer the opportunity to fund CCS projects and its value chain in order to develop a European decarbonised industry.

<sup>3</sup> Intergovernmental Panel on Climate Change (2018), Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change <https://www.ipcc.ch/sr15/>

<sup>4</sup> Risks of leakage are extremely low, with an estimated 99% containment over 1000 years. IPCC (2005) Special Report on Carbon Dioxide Capture and Storage, p.14.

<sup>5</sup> 300 GtCO<sub>2</sub> of storage capacity has been estimated at a high-level. Global CCS Institute (2018). Global Status of CCS 2018. Available at <https://www.globalccsinstitute.com/resources/global-status-report/download/>

<sup>6</sup> Imperial College, March 2020, 'Global geologic carbon storage requirements of climate change mitigation scenarios' available [here](#).

<sup>7</sup> IOGP coordinate report for the Madrid Forum, 5-6 June 2019 [The potential for CCS and CCU in Europe](#)

<sup>8</sup> Figures available in 'Hydrogen for Europe Final report of the pre-study' [here](#)

<sup>9</sup> SINTEF Energi AS, 2018Ø. Størset, G. Tangen, O. Wolfgang, and G. Sand, "Industrial opportunities and employment prospects in large-scale CO<sub>2</sub> management in Norway," [here](#)

<sup>10</sup> The first call for projects has been launched on 3rd July [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_20\\_1250](https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1250)

## CCS Projects in Europe

CCS is a reality in Europe with 2 projects in operation and 10 in various stages of development<sup>11</sup>, and many more could emerge in the future. Please find below examples of hub and cluster-based CCS projects which would need public support to get ready.

### Examples of hub and cluster-based CCS projects

#### The Rotterdam CCUS project Porthos<sup>12</sup>

The Rotterdam CCUS project Porthos (Gasunie, EBN, & Port of Rotterdam Authority) aims at collecting the CO<sub>2</sub> from multiple industrial installations in the Rotterdam port area and transport it in an **open-access, public pipeline for offshore storage** to a depleted gas field 25km from the coast at a depth of around 3 km. Under the plan, around 2.5 – 5 Mtpa CO<sub>2</sub> from the **refineries and chemical plants** in the port would be captured and stored. A relatively small amount of CO<sub>2</sub> from Rotterdam industry is already being used (CCU) by greenhouse horticulture in South Holland, where it enables plants to grow faster. The Porthos infrastructure will also be suitable for transporting CO<sub>2</sub> for use by industry, if there is demand for this in the future.

In February 2019, companies were invited to participate to an 'Expression of Interest', to signal their potential readiness to supply volumes of CO<sub>2</sub> into the planned public collector pipeline. As of December 2019, Porthos has signed an agreement with companies ExxonMobil, Shell, Air Liquide and Air Products to work on preparations for the capture, transport and storage of CO<sub>2</sub>. The capture is to take place at the companies' refineries and hydrogen production sites in Rotterdam. Transport to and storage beneath the North Sea is being prepared by Porthos. Sharing a common infrastructure between several industrial sites, the Porthos project aims to **drive cost efficiencies** relative to old CCS business models based on a single industrial emitter. The project was awarded CEF funding in January 2019 and has enjoyed the status of Project of Common Interest (PCI) since 2017.

Finally, the Dutch government, has put in place a financing scheme SDE++ which is a kind of contract for differences between the current ETS Price and the needed CO<sub>2</sub> price to make the project economically viable.

#### Northern Lights and The Norwegian full-scale CCS project

The Northern Lights project is designed to constitute **a ship-based open source European CO<sub>2</sub> transport and storage network**. By recovering CO<sub>2</sub> emissions from European industries, the project is looking to achieve economies of scale and lower costs, while also making a larger-scale contribution to reducing EU CO<sub>2</sub> emissions. Due to its pan-European approach, the project will facilitate the establishment of horizontal industry-wide standards to promote the interoperability of the CO<sub>2</sub> ships and storage sites with EU Member States. The ship-based solution makes CCS relevant for many companies and industrial sites, as they now can connect to a CO<sub>2</sub> storage solution. Northern Lights has identified 350 industrial sites with CO<sub>2</sub> emissions of more than 100 ktpa that are within reach of its ships, and have signed MoUs with 7 of them in 6 European countries.

The CO<sub>2</sub> shipping component of this project first received PCI status in 2017. In 2020, the project was granted an updated PCI status, expanding its geographical scope to capture sites located in Belgium, France, Germany, Ireland, the Netherlands, Sweden and the UK. Equinor, Total and Shell are responsible for the transport and storage parts of the project. The partners have taken their investment decision and await final funding support decision of the Norwegian State in 2020. The Northern Lights CO<sub>2</sub> transport and storage project is then planned to start operating in 2024, and the project's extension to cross-border shipping of CO<sub>2</sub> is expected to take place from 2024-25.

<sup>11</sup> Please see details of projects in the IOGP map of European CCS projects <https://www.oilandgaseurope.org/news/map-of-eu-ccs-projects/>

<sup>12</sup> Rotterdam CCUS project Porthos information: <https://www.rotterdamccus.nl/en/>

The Norwegian full-scale CCS project, of which Northern Lights is the transport and storage part, aims to become the world's first CCS project receiving CO<sub>2</sub> from **several industrial sources**. The concept of the Norwegian full-scale CCS project foresees CO<sub>2</sub> capture in two onshore industrial facilities for transport by ship to a receiving point in Naturgassparken in Øygarden municipality, where it will be sent through pipelines to offshore injection wells on the Norwegian Continental Shelf.

### Net Zero Teesside

Net Zero Teesside is a CCUS project located in Teesside in the North East of England. It aims to decarbonise a cluster of carbon-intensive businesses by as early as 2030 and deliver the UK's first zero-carbon industrial cluster. Working in partnership with local government, local industry and with committed, world class partners ENI, Equinor, Shell, Total, all led by bp, the project plans to capture up to 10 million tonnes of carbon dioxide emissions per year, the equivalent to the annual energy use of over 3 million UK homes.

A combined cycle gas turbine power station with carbon capture facilities will underpin the investment in the CO<sub>2</sub> transportation and storage infrastructure. This power station will provide low carbon power to the national grid, complementing power from renewable energy sources. Industrial emitters in the area will be able to use the CO<sub>2</sub> transportation and storage system as a CO<sub>2</sub> storage service, leading the way to the decarbonisation of the industrial cluster. Teesside's location on the coast offers access to CO<sub>2</sub> storage sites in the southern North Sea with more than a gigaton of CO<sub>2</sub> storage capacity.

In addition to emissions reductions, there is a forecast economic benefit for the region and country. Net Zero Teesside could support £370m in gross value added and 4,500 direct jobs annually from 2024-2028, reaching a peak of £450m gross value added and 5,500 direct jobs in 2025. Development of a CCUS cluster at Teesside supports UK-wide deployment of CCUS in line with the UK Government's net zero target, which could support £1.6bn in GVA and 18,000 direct jobs annually by 2030.

**For more information on CCS, please refer to the list of policy and communication material developed by IOGP overleaf.**

## Annex – IOGP policy paper:

- **IOGP coordinated report “The potential for CCS and CCU in Europe”:** The 31st Madrid Forum invited IOGP to coordinate a report on the potential of Carbon Capture and Storage (CCS) and Carbon Capture and Utilisation (CCU) technologies, including technical, economic and public acceptance considerations, working with all interested stakeholders. A Taskforce composed of interested stakeholders was subsequently established, and this group began regular discussions, including on current regulatory barriers and incentives. [https://ec.europa.eu/info/sites/info/files/iogp\\_report\\_-\\_ccs\\_ccu.pdf](https://ec.europa.eu/info/sites/info/files/iogp_report_-_ccs_ccu.pdf)
- **IOGP CCS Map** which provides An overview of existing and planned Carbon Capture and Storage facilities in Europe <https://www.oilandgaseurope.org/news/map-of-eu-ccs-projects/>
- **The Hydrogen for Europe pre-study** has been undertaken with the purpose of assessing current knowledge about the potential hydrogen has to decarbonise the European economy. [http://www.oilandgaseurope.org/wp-content/uploads/2020/01/IOGP\\_Hydrogen-for-Europe-Final-report-of-the-pre-study\\_reportstudy.pdf](http://www.oilandgaseurope.org/wp-content/uploads/2020/01/IOGP_Hydrogen-for-Europe-Final-report-of-the-pre-study_reportstudy.pdf)
- **Initial views on TEN-E Guidelines.** Regulatory changes will be necessary to enable the roll-out of infrastructure for CCS and hydrogen. This paper outlines our initial feedback to the upcoming evaluation and review of the Regulation on guidelines for Trans-European Energy Infrastructure (TEN-E): <https://www.oilandgaseurope.org/wp-content/uploads/2020/04/IOGP-initial-views-on-TEN-E-guidelines-paper.pdf>
- **New and old CCS projects in Europe:** CCS failed to live up to its potential during the previous investment cycle (2009-2015). This paper outlines what has changed since then in terms of regulatory context and the development of new business models for CCS, making the case for CCS as a key component in reaching the EU's long-term climate objectives: <https://www.oilandgaseurope.org/wp-content/uploads/2020/04/New-and-old-CCS-projects-in-Europe-paper.pdf>
- **Policy matrix: key recommendations on CCS in the current and future EU legislative framework:** This document provides an overview of existing EU legislative measures, highlighting for each of them the key changes needed to enable the development of CCS in Europe at larger scale: <https://www.oilandgaseurope.org/ccs-in-the-current-and-future-eu-legislation-paper/>

**Registered Office:** City Tower, Level 14, 40 Basinghall Street, London EC2V 5DE, United Kingdom  
T +44 (0)20 3763 9700 / [reception@iogp.org](mailto:reception@iogp.org)

**Brussels Office:** Avenue de Tervuren 188A, B-1150 Brussels, Belgium  
T +32 (0)2 790 7762 / [eu-reception@iogp.org](mailto:eu-reception@iogp.org)

**Houston Office:** 19219 Katy Freeway, Suite 175, Houston, TX 77094, USA  
T +1 (713) 261 0411 / [reception@iogp.org](mailto:reception@iogp.org)

[www.iogp.org](http://www.iogp.org)  
[www.oilandgaseurope.org](http://www.oilandgaseurope.org)