

CO₂ storage in the North Sea – enabling decarbonisation of the industry

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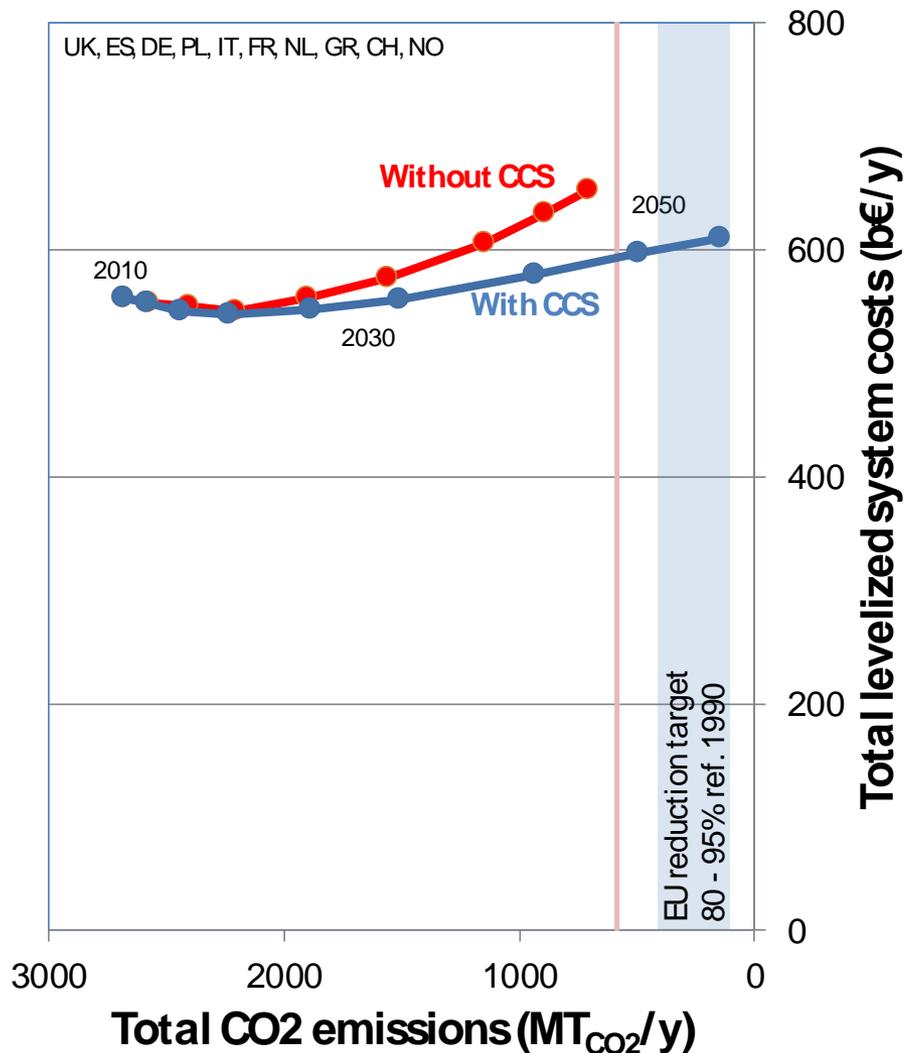
12th October

ZEP's role

- ZEP serves as advisor to the European Commission on the research, demonstration and deployment of CCS and CCU (referred to as CCUS).
- Coalition of stakeholders (energy intensive industry, oil and gas companies, equipment suppliers, scientists, academics, environmental NGOs) united in their support for CCUS.
- The objectives of ZEP are:
 - Enabling CCUS to be a key technology for combating climate change for all CO₂ emitting sectors, including electricity, energy intensive industry and producers of hydrogen and biofuels.
 - Making CCUS an investible technology by 2020.
 - Accelerating next generation RD&D of CCUS technology and the widespread deployment post 2020.
- Supported by EC's Horizon 2020 (Grant no. 826051)
- ZEP reports can be downloaded from website:
<http://www.zeroemissionsplatform.eu/>



CCUS can support greater climate ambition



- Analysed emissions reduction pathways for 10 European countries
- 95% emission reduction can only be achieved with CCUS
- Without CCUS emissions in 2050 are 3-4 times higher
- Saving up to 2050 with CCUS = more than 1 Trillion Euro for EU as a whole
- Saving 50 Billion Euro per year ongoing across the 10 countries modelled

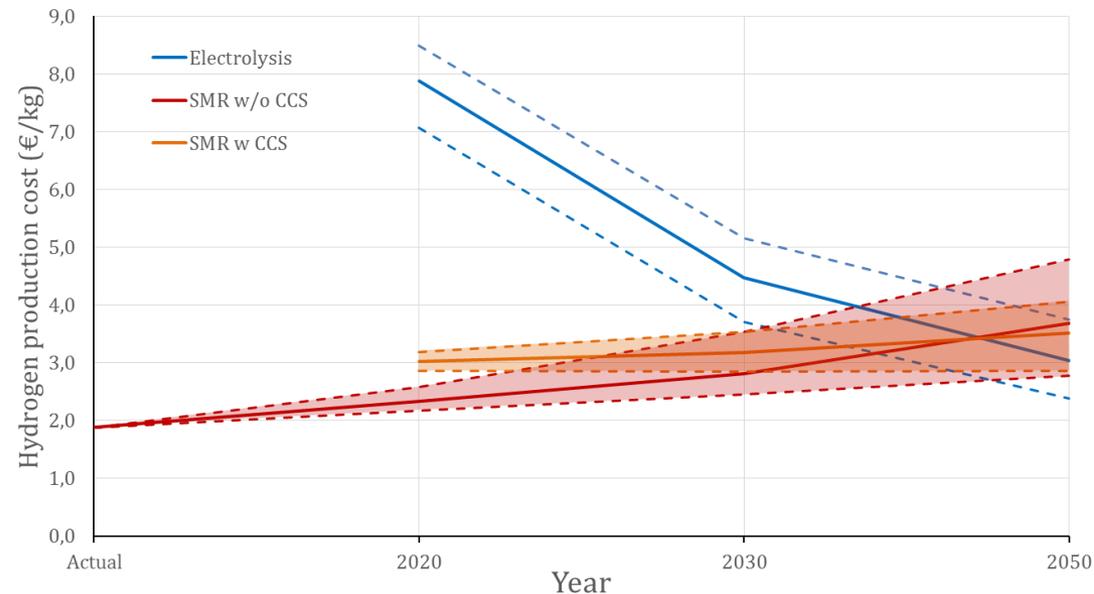
Role of CCUS in a below 2 degrees scenario



- Paris Agreement commits the world to net-zero emissions - CCUS essential part of the lowest cost solution, particularly for 'hard to mitigate' sectors such as industry and heat
- Europe cannot rely on potential breakthrough technologies and fundamental changes in consumer behaviour – need to deploy solutions available today in industry
- Without CCUS, Europe's industrial regions are at risk as climate pressures mount, threatening the eventual exodus of process industries and millions of associated jobs
 - Germany; over 50 million tonnes of CO₂ would remain unabated without CCUS
 - Risking about 3.5 million steel-related jobs
 - Several hundred thousand more in the chemicals and cement sectors.
- CCUS enables a 'just transition' - sustaining the economic contribution of industrial sectors, creating new jobs and preserve existing ones and generating economic growth
- Establishing a shared CCUS infrastructure that links industrial regions with storage resource will protect jobs, and create new economic prosperity for Europe

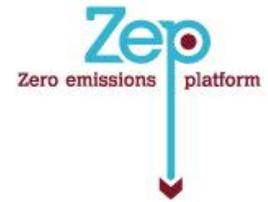
Commercial-scale clean hydrogen

Hydrogen production cost comparison

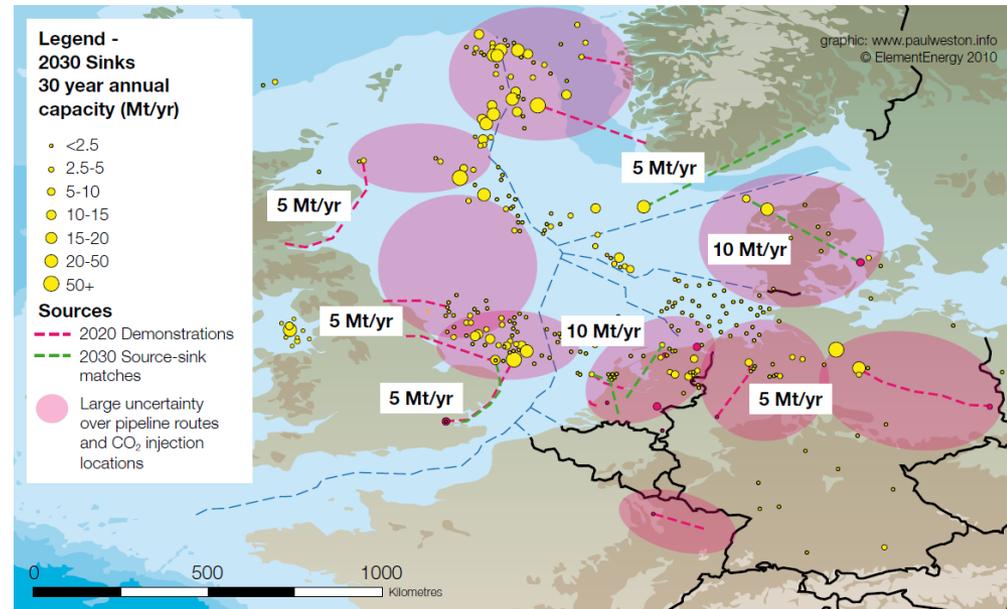


- Hydrogen can decarbonise multiple industries and support the energy transition
- Low carbon hydrogen production
 - Reforming natural gas with CCUS
 - Electrolysis using renewable energy
- CCUS hydrogen an enabler of the hydrogen economy - available at lower cost and higher volume
- Identify policies and stable support mechanisms that promote the production of clean hydrogen to create economically viable clean hydrogen projects.
- Identify regional clusters where synergies could be established between hydrogen production, hydrogen consumption, and CCS, for example the industrial clusters of Antwerp, Rotterdam and Teesside.

Developing European Transport and Storage Infrastructure



- CO₂ clusters linked to storage hubs is lowest cost route to CCUS
- Europe can link large CO₂ emissions clusters to world class CO₂ storage assets
- Regional collaborative approach to infrastructure can unlock full potential of CCUS for Europe



- Projects of Common Interest list includes CO₂ transport projects for the first time;
 - Equinor - CO₂ cross border transport UK & NL, with storage in Norway
 - Pale Blue Dot – CO₂ Sapling Transport Infrastructure Project
 - Port of Rotterdam Authority – The Rotterdam Nucleus
 - Tees Valley Combined Authority – Teesside CO₂ Hub
- Eligible for infrastructure funding through the Connecting Europe Facility (CEF)

Conclusions



1. CCUS enables a just transition, and needs to be deployed at scale now to enable Europe's energy transition.
2. European policy makers have the chance now to deliver a supportive policy framework for CCUS, for example:
 - Connecting Europe Facility to support cross-border CO₂ transport infrastructure.
 - Innovation Fund to support early CCUS projects
 - Research and innovation funds should be appropriately focused to develop technology solutions to support deep decarbonisation of EU industry
3. CCUS is an essential part of any technology pathway for Europe, and the Long Term Strategy must clearly recognise its role.