





CO₂GeoNet

The European network of excellence on the Geological Storage of CO_2

Growing CO₂ storage to meet climate targets Ceri Vincent, CO₂GeoNet BGS

Mediterranean Pavilion side event COP27, 11th November 2022



What is CO₂ capture and storage?



CO₂ captured commercially since ~1938

Oldest pipelines ~1970s >6500 km of CO₂ pipeline worldwide

CO₂ Capture and storage uses proven technology and industrial experience





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Over 260 million tonnes (Mt) of CO₂ emissions from human activity (anthropogenic sources) has already been captured and stored (Global CCS Institute, 2019. The Global Status of CCS: 2019. Australia)

transported

Stored deep underground

First injection of CO₂ in oil fields ~1972 First injection for pure storage, Sleipner 1996







How does CO, storage work?

CO₂ is stored in the pore spaces in the storage reservoir rocks deep underground

 CO_2 is trapped underneath a thick geological seal





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http://www.co2geonet.com/resources/#1392

How can CCS help meet climate targets?

Geological storage of CO₂:

- enables significant & rapid reduction in emissions from any large fixed CO₂ source
- Can be used to reduce emissions from multiple sectors power, chemicals, commodities.....
- Only currently viable mitigation option to decarbonise the production of commodities such as cement, iron and steel
- Can help offset hard to abate emissions to help achieve a net zero future
- Can offer negative emissions when coupled with Direct Air Capture or bioenergy using sustainable biomass



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IPCC special report – pathways to 1.5°C

- Rapid and transformative action needed to reduce emissions and tackle climate change
- All pathways that limit global warming to 1.5°C with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100–1000 GtCO₂ over the 21st century
 - Existing and potential CDR measures include afforestation and reforestation, land restoration and soil carbon sequestration, BECCS, direct air carbon capture and storage (DACCS), enhanced weathering and ocean alkalinization
- In 1.5°C pathways with no or limited overshoot: •
 - **Energy** has higher share of low emission energy sources including renewables, **CCS** with gas, coal decreases to zero
 - and storage (CCUS).



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IPCC, 2018: Global Warming of 1.5°C. An IPCC 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, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press

Industry reduces emissions using new & existing technologies including electrification, hydrogen, sustainable bio-based feedstocks, product substitution, and carbon capture, utilization

An energy perspective - IEA

- use energy
- extends electricity's reach
- biofuels, offset emissions

Global energy sector *CO₂ emissions* reductions by measure in the Sustainable Development Scenario relative to the Stated Policies Scenario, 2019-2070





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IEA 2020: Achieving net-zero emissions requires a radical transformation in the way we supply, transform and

Spreading the use of electricity into more parts of the economy is the single largest contributor to reaching netzero emissions. Reaching net-zero by 2050 requires rapid deployment of low-carbon power generation. Hydrogen

Carbon capture and bioenergy play multifaceted roles. Low carbon fuels, CDR, bioenergy, hydrogen, replace

Cumulative, 2020-70







Energy

Licence:





An industry perspective – GCCA

- Vision for how the cement and concrete industry will play a major role in building the sustainable world of tomorrow
- The sector is committed to producing net zero concrete by 2050 and is committed to acting now
- Roadmap sets out a net zero pathway to help limit global warming to 1.5°C





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Concrete Future. The GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete. Roadmap full document. https://gccassociation.org/concretefuture/wp-content/uploads/2022/10/GCCA-Concrete-Future-Roadmap-Document-AW-2022.pdf



Are we meeting our climate targets?

a. Global GHG emissions



on the Geological Storage of CO₂

Global GHG emissions of modelled pathways: AR6 WGIII

Modelled pathways:

Trend from implemented policies Limit warming to 2°C (>67%) or return warming to 1.5°C (>50%) after a high overshoot, NDCs until 2030 Limit warming to 2°C (>67%)

- Limit warming to 1.5°C (>50%) with no or limited overshoot
- Important Past GHG emissions and uncertainty for 2015 and 2019 (dot indicates the median)

IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926



GCCSI Global Status of CCS – CCS is growing, but needs to accelerate

GCCSI (2020) noted: Currently, some 40 megatonnes of CO₂ are captured and stored annually. This must increase at least 100fold by 2050 to meet the scenarios laid out by the IPCC

Global CCS Institute, 2020. The Global Status of CCS: 2020. Australia



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How do we grow CO₂ capture and storage?

- IEA @ COP21: Use the Paris Agreement a term emission goals
- CCS can play a key part in a just transition to a low-emission future
- CCS is an opportunity for economic growth and job creation
- So what do we need to grow CCS?
- Practical, well-defined governance: Clear, consistent and long-term policy and regulatory measures are needed to provide a predictable business landscape that will attract investment
- **Financial mechanisms**: A level playing field with other climate-friendly technologies...subsidies and/or incentives and tailored financial mechanisms
- More real projects! Anchor projects that can form nodes in CCS networks with capture hubs and storage clusters, plus R&D projects to refine aspects of CCS



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IEA @ COP21: Use the Paris Agreement to drive short-term actions consistent with long-



Thank you for your time



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MEDITERRANEAN PAVILION

