Carbon Capture and Storage: Outlook and Challenges

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1. Potential
2. Status
3. Challenges
4. IEA activities
CCS: SIGNIFICANT POTENTIAL

- 2nd largest share (19%) of CO₂ reductions in 2050
- 31% of CO₂ reductions in power sector in 2050
- Scenario without CCS-power: + USD 4.7 trillion additional investment cost 2010-2050
CCS: CHALLENGING DEPLOYMENT

3400 projects operational in 2050
2/3 of projects outside OECD countries in 2050
CCS NOT ONLY ABOUT “CLEAN COAL”

Coal power only makes up around 40% of stored emissions in 2050
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CO₂ IS CAPTURED AND STORED AS WE SPEAK...

Five large-scale projects in operation
... AND MORE IS PLANNED

80+ integrated large-scale projects in various stages of development
GLOBAL CCS DEMONSTRATION: PLANS

Significant new project development activity

- especially for CCS in coal-fired power generation
- Other large stationary emissions sources such as steel and cement production significantly under-represented
- Clusters of projects in North-America, Europe and Australia
- In terms of a “balanced portfolio” - significant under-representation in developing countries
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UNCLEAR STRATEGIC DIRECTION

- Only modest commitments to cut global CO$_2$ emissions
- Limited public and government understanding of CCS
- Limited attention to industrial CCS applications
INCOMPLETE REGULATION

- Lack of legal and regulatory frameworks especially in key non-OECD countries
- Outstanding issues in domestic legal and regulatory frameworks e.g. long-term liability
- Outstanding international legal issues e.g. ratification of the London Protocol and OSPAR amendments
STORAGE SPACE

- No common **methodology** to estimate storage capacity
- Uneven data on global/regional/national storage capacities
- Limited appreciation of the **time** and **money** required to select and characterise a CO$_2$ storage facility
FUNDING

- **Insufficient** or **slowly emerging** financing by industry and governments for CCS demonstration
- Limited incentives for commercial-scale **deployment**
- No broad mechanism for financing CCS in **non-OECD countries**

**FIGURE 2:** Funding announcements and allocations by country

- **USA**: 5.2 US$ B
- **European Union**: 6.4 US$ B
- **Canada**: 3.1 US$ B
- **United Kingdom**: 0.2 US$ B
- **Australia**: 1.9 US$ B
- **South Korea**: 1.2 US$ B
- **Norway**: 1.0 US$ B

**GCCSI**
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WHAT ARE WE DOING?

- Model Regulatory Framework just published
- Supporting UNIDO: Global Roadmap for CCS in industry
- Economic instruments to support CCS demonstration and deployment (in planning)
- Roadmap for global methodology on storage capacity estimation (in planning)
AIMS

- To assist governments in the development of national legal and regulatory frameworks
- Proposes key principles for handling regulatory issues associated with CCS
## KEY ISSUES

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6.4 Regulating site selection and characterisation activities

1. A site characterisation process as required by the relevant authority must be undertaken in respect of a proposed storage site.

2. The results of the site characterisation process must be submitted as part of a storage authorisation application.

3. To be a suitable storage site, the site characterisation process must indicate that a proposed storage site:
   a. has sufficient storage capacity for the intended quantity of CO₂ to be stored;
   b. has sufficient injectivity for the intended rate of CO₂ injection; and
   c. is free of faults, fractures, wells or other features that are likely to allow unintended migration.

4. A proposed storage site is not suitable where the site characterisation process indicates that it poses significant:
   a. risk of unintended migration;
   b. risk of leakage;
   c. environmental risks;
   d. health risks; or
   e. risk to other resources.

5. Where the location of a proposed storage site would result in the existence of more than one storage site in the same primary storage formation, the potential interaction of the sites (including but not limited to interaction of CO₂ plumes and pressure interactions) must be such that both sites will meet, or continue to meet, the requirements of this section 6.4.
ECONOMIC INSTRUMENTS

- To evaluate and propose policy instruments that could support CCS deployment in OECD and non-OECD countries
- Useful to national and international policy makers
- Builds upon IEA technology road map
- Scope
  - Power generation and industry
  - Demonstration and large-scale projects
  - International funding and finance options
  - Interaction with (renewable) energy policies
  - Biomass
Thank you!

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www.iea.org/ccs