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Policy and Regulation

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• Recommendations
Regulation of CO\(_2\) transportation

- EU Directive on the geological storage of CO\(_2\)
  - Amendment to EU Waste Framework (Article 35)
  - Transfrontier Shipment of Waste Regulation (Article 36)
  - The composition of a CO\(_2\) stream (Article 12)

- The 1996 London Protocol (international)
  - Resolution LP. 3(4), addition to Article 6 on the export of CO\(_2\) between contracting parties

- OSPAR convention (2006) - 7\(^{th}\) ratification received - 2011

- 2010 MRG for CCS in the EU ETS
  - Activity specific guidelines for CO\(_2\) transport
  - Fugitive and vented emissions
  - Approaches to emissions calculations
Impurities in the CO$_2$ stream

• There is no quantitative requirements for the composition for the CO$_2$ stream – “overwhelmingly CO$_2$“

• Different viewpoints from within industry: flexibility vs. uncertainty

• Capture: Industrial (cement, steel) stakeholders lack purity benchmark

• Transport: Less of a problem for single pipelines – potential issues of interoperability in pipeline infrastructures

• Possible synergetic effects – little known
EU ETS Activity specific guidelines

- In June 2010, the European Commission released an amendment to the original MRGs for the EU ETS released in 2007

- ‘Activity-specific guidelines’ for the determination of emissions from the transport of CO₂ through pipelines to geological storage sites

- Mass-balance calculation (A)

- Calculation based methodology (B)

- Guidelines for capture, pipeline transport, storage and EOR – shipping CO₂ unclear
Development of CO$_2$ transport infrastructure

• Annex 1 of EIA directive - > 800 mm and a length of > 40 km include associated booster stations - Mandatory

• In a transboundary context – the ‘Espoo procedure’ stemming from the UNECE Convention is applicable for contracting parties

• Within the directive, there is no reference made to the technical standards for the design, construction, monitoring or the maintenance of pipelines.

• European standards and guidelines
  • BS EN 14161:2003 - Petroleum and Natural Gas Industries
  • PD 8010:2004 Code of practice for pipelines
  • DNV OS-F101 - Submarine Pipeline Systems 2007
  • Recommended Practice DNV-RP-J202
Third-party access

- Access to CO₂ transport networks as well as storage sites, could become a condition for entry into or competitive operation within the internal electricity and heat market.

- Member States should take necessary measures to ensure that potential users are able to access transport facilities, and that the granting of access will be done in a transparent and non-discriminatory

- Access to the network will follow the objectives of fair and open access.

- Article 22, stipulates that Member States must have an independent authority capable of settling disputes between operators and potential users of a network.
Policy options for supporting transport infrastructure

- No specific policy for the development of CO₂ transport infrastructure

- EU ETS price to cover capture, transport and storage costs of a single project

- NER 300 funding covers individual projects cost – excluding any form of over sizing

- Oversizing pipelines and other infrastructure in anticipation of increasing volumes of CO₂ have potential to improve long-term economic efficiency

- How to fill the financing gap?
Investment model of a CO₂ pipeline

- Equity
- Grants
- Commercial loans
- Government funding

Project financing

Funding

Risk

Project cost

Financeability

Project revenue

Risk

- Transportation tariffs
- Project lifetime
- Throughput
- Storage site capacity
- CO₂ supply
Market powers

- DECC 2009 - If a pipeline was built oversized or maintained with a view to taking third-party business, tariffs may be set at a level that would earn the owner a reasonable return on investment, reflecting the risks involved.

- Efficiency vs. underinvestment

- However, access to equity and commercial loans for significant oversizing without guaranteed capacity utilization – very challenging

- Uncertainty of external capacity demand, in terms of volume and timing - great financial risks to the project developer

- Long-term contracts / ‘Open seasons’ / Market testing
Market-led concept

**Ownership**
Consortium of market actors, including emitters, oil and gas companies, transport companies and project developers

**Operator**
Consortium of market actors contract a company to manage and operate, or do it themselves

**Transport Coordination**
There is no central direction. The owners decide themselves the route for pipelines or to use ship transport

**Storage Coordination**
There is no central direction. The owners decide themselves who they will contract for the storage, or storage firm sits within the consortium

**Capacity control and tariff setting**
Negotiated access. Parties inside the consortium already have access. Consortia decide tariff for external users. Third party access possible under Article 21 2009/31/EC Directive, although not guaranteed.
Public involvement

- Level of involvement:

- Coordination

- Grants/subsidies

- Loans (through designated financial institutions)

- Guarantees (risk coverage to attract further investment)

- Co-investment (through PPP)

- Public funding can reduce the risk to market investors, although uncertainty on capacity demand remains
State-led concept

Ownership
Owned by a state owned enterprise, but market parties can co-invest

Operator
State owned enterprise is given the rights to the networks, and a state owned monopoly of onshore and offshore CO₂ transport is created

Transport Coordination
The enterprise follows a government route plan (10/15/20+ years) with over dimensioning, based on an inventory of possible emission sources and storage locations

Storage Coordination
The state-owned enterprise tenders for CO₂ storage providers

Capacity control and tariff setting
Regulated capacity. Every emitter has in principle entry to the network and the storage locations. A tariff is set using non-discriminatory criteria, and a new regulatory body governs tariffs and further investment
Public-private Partnership
Recommendations - Regulation

• Evaluate proposed third-party access regimes on a European scale, in order to prevent regulatory misalignment with regards to cross-border pipelines. This may also be resolved on a bi- or multilateral level between the states involved.

• In order for CO$_2$ pipeline developers to take advantage of economies of scale and over-dimension pipelines, the intentions of Member State governments regarding the regulation of tariffs for third-party users need to be established.

• Eliminate barriers to growth from issues of interoperability – EU wide standards - guidelines on the level of co-contaminants

• Clarify how emissions generated through shipping CO$_2$ will be taken into account in the whole chain

• The amendment to the London Protocol must be ratified
Recommendations – Policy

• Government intervention is required now to organize a future European CO₂ transport network infrastructure that will support the level of CCS deployment required to help contribute to meeting EU CO₂ reduction goals.

• A robust policy roadmap is fundamentally important for private industry and the public sector to reduce uncertainty and reduce the financial risk.

• The development of CCS clusters has great potential for cost sharing, and the provision of access to CO₂ infrastructure to both energy and importantly, industrial stakeholders.

• Public-private business models for CO₂ infrastructure should be developed, covering contractual, risk-sharing and financing possibilities.

• NER300 Knowledge sharing essential for all aspects of CO₂ transport
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