

A photograph of a rocky coastline with white sand and a clear blue sky. The rocks are light-colored and layered, with some large boulders scattered on the sand in the foreground. The sky is a clear, pale blue.

CO2Europe
Project activities and results
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Policy and regulation
concerning CO₂ transportation

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The legal challenges of CO₂ transportation

- Definition of CO₂
- Health and safety guidelines and procedures
- Liability of harm caused by accidents
- Permitting issues
- Third-party access
- Environmental impact and planning procedures
- Conflicting state jurisdictions for transboundary movement

Regulation of CO₂ transportation - Europe

- EU Directive on the geological storage of CO₂
 - Amendment to EU Waste Framework (Article 35)
 - Transfrontier Shipment of Waste Regulation (Article 36)
 - EIA requirements (Article 31)
 - The composition of a CO₂ stream (Article 12)
- Transposition due in June 2011 - in many (2/3?) Member States it has been delayed – EU infringement process underway
- 2010 MRG for CCS in the EU ETS
 - Activity specific guidelines for CO₂ transport
 - Accounting for fugitive and vented emissions
 - Approaches to emissions calculations

The 1996 London Protocol (international)

- Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
- *'CO₂ streams from CO₂ capture processes for sequestration'* - added to Annex 1 'considered for dumping' – Nov 2006
- However - Article 6(1) provided that *'Contracting Parties shall not allow the export of wastes or other matter to other countries for dumping or incineration at sea'*
- Resolution LP. 3(4), addition to Article 6 on the export of CO₂ between contracting parties – 2009 – ratification needed (27/40)
- Currently just Norway and the Netherlands...

Development of CO₂ transport infrastructure

- Annex 1 of EIA directive - > 800 mm and a length of > 40 km included associated booster stations - Mandatory
- In a cross-border context – the ‘Espoo procedure’ requires EIA for transboundary pipelines
- 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

Impurities in the CO₂ stream

- There is no quantitative requirements for the composition for the CO₂ stream – “overwhelmingly CO₂“
- 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
- Requirement for continuous emissions monitoring systems
- Mass-balance calculation (A)
- Calculation based methodology (B)
 - *Fugitive, vented, leakage events, installations*

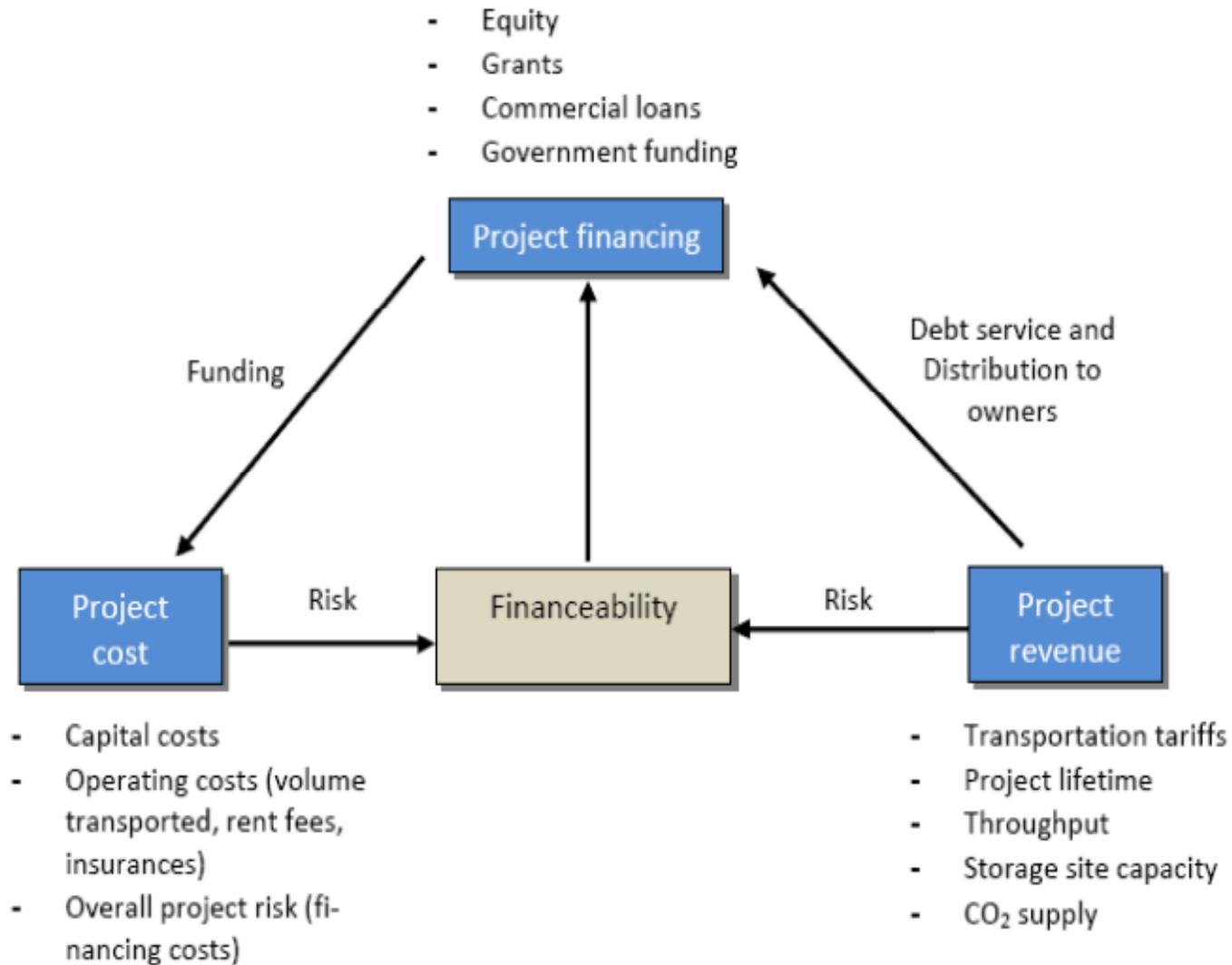
Third-party access

- 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



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

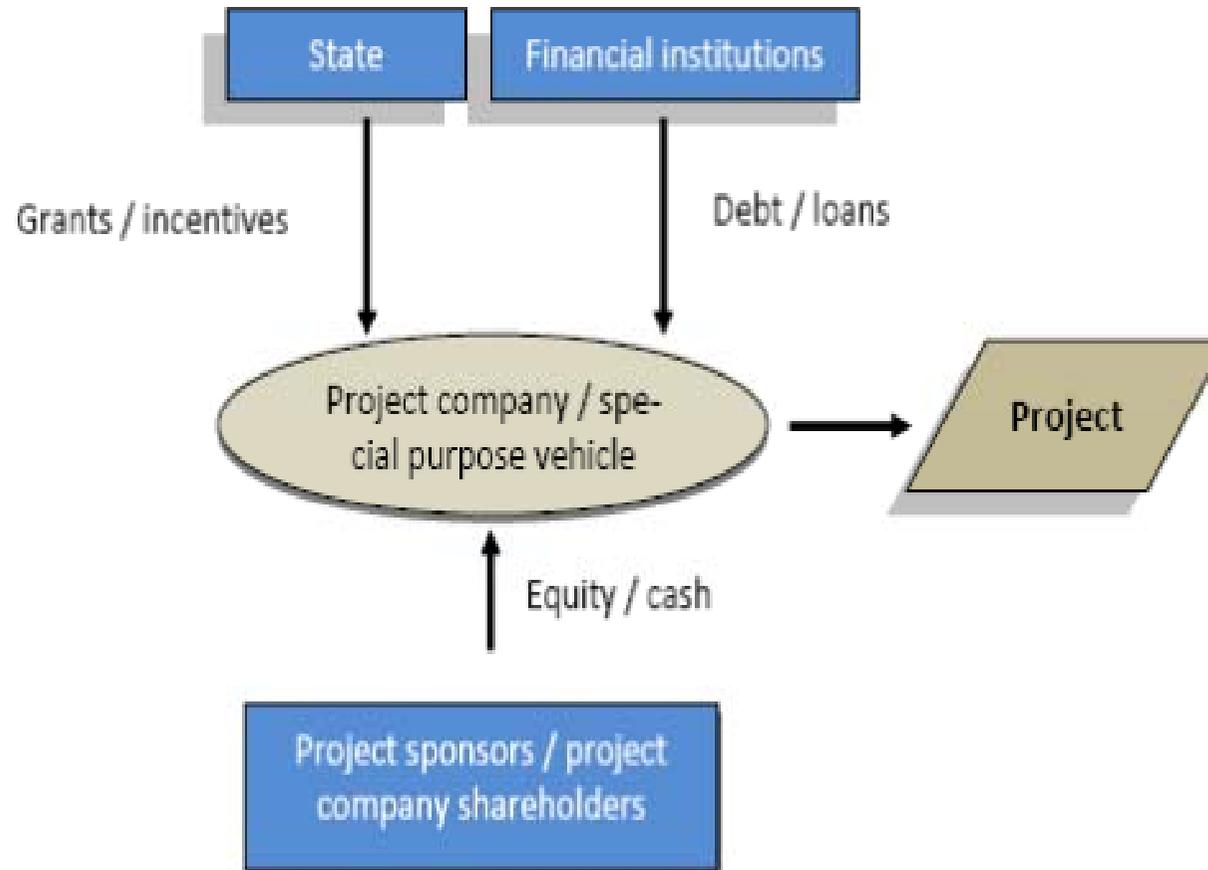
Storage Coordination

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.
- In order for CO₂ 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 – ISO standard?
- Clarify how/whether emissions generated through shipping CO₂ will be taken into account in the whole chain
- The amendment to the London Protocol must be ratified, or alternative solutions sort – provisional application, (multi)bilateral treaties?

Recommendations – Policy

- In the near term, financial guarantees will be required if investment is to take place for large scale CO₂ transportation
- Public funds will be need to lever additional private capital if pipelines are to be over-dimensioned
- Connecting Europe Facility – Cross border CO₂ trans thematic priority area - (€9.1b) – 2020? – Second round?
- 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.
- NER300 Knowledge sharing essential for all aspects of CO₂ transport

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