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The Potential for CCS and CCU in Europe

Meeting with DG GROW
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Madrid Forum CCS CCU Taskforce

- Taskforce was established involving all interested stakeholders
  - Taskforce included ENTSOG, IEA, ZEP, CEER, CO2 Value Europe, IFIEC, EFET, Gassnova, Global CCS Institute, GIE, Eurogas, Fertilizers Europe, CEFIC, OGCI, IPIECA, NGOs, CEN, European TSOs and DSOs, CCS projects Northern Lights, PORTHOS and Ervia, IOGP member companies and other energy companies, Prof. [redacted] of Universidad Politécnica de Madrid, SINTEF, IFPEN and the European Commission
  - IOGP sincerely thanks all Taskforce participants for their cooperation, contributions and participation

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Role of CCS & CCU and business case

- CCS is an essential technology to cost-effectively reach the Paris Agreement
  - IPCC 1.5° SR shows a key role for CCS, e.g. enabling negative emissions
  - CCS enables low-carbon hydrogen, as well as reduction of post-combustion and process emissions from industry
  - CCS is a proven and safe technology, with 18 existing commercial projects and over 200Mt stored to date (mainly EOR)
- CCU can promote sector coupling through synthetic methane, as well as recycle CO2 into products and permanently sequester CO2 in building materials
- Public financial support is currently required for early deployment
  - Support can be reduced as economies of scale develop
- CCS value chain can be separated, to effectively target incentives and public support
  - Business case benefits from economies of scale, to reduce unit costs and enhance infrastructure efficiency
  - Hydrogen provides a new business case, by integrating CCS into a scaled-up energy supply system

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Public acceptance and CO2 storage

- CCS & CCU can decarbonise infrastructure and key economic sectors
  - Buildings, steel and heating, etc, thereby ensuring continuous use of existing infrastructure and promoting local and regional economic activity
- Risk of CO2 leakage is very low
- In Europe, CO2 storage will likely take place offshore, e.g. North Sea (requiring cross-border CO2 transport within EU)
- Storage capacity in fields and saline formations in Europe is ample
  - Taking into account MS restrictions, ~134 GtCO2 exists (446 years worth of CO2 storage at a rate of 300Mtpa)
  - Deep saline aquifers offshore provide the largest capacity and scale-ability, but more exploration and appraisal is needed

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Capture: business case and policy recommendations

- Costs of CO2 capture currently exceed ETS incentives and require additional support
- Capturing CO2 from industrial clusters creates economies of scale, and efficient use of transport infrastructure

Policy recommendations – consider support for early deployment

- Tradeable tax credits for capture facilities, e.g. 45Q
- 'Contracts for Difference' for power generation
- Markets for decarbonised products, e.g. Guarantees of Origin
- Governments guarantees to the capture facility, e.g. Norway
- Amend EU ETS Monitoring and Measurement Regulation (MMR) Art. 49 to recognise appropriate CCU applications, subject to a life–cycle analysis
- Recognise and reward CO2 transport by ship/rail/truck, in a similar way to pipelines, in the MMR

Transport: business case and policy recommendations

- CO_2 transport options include onshore and offshore pipelines and ships
  - Shipping preferable for small volumes
  - Existing and new-build pipelines are likely to be needed
  - Offshore and onshore pipelines can be repurposed for CO_2 transport

Policy recommendations:

- Enable gas infrastructure or other companies, where Member States so decide, to transport CO_2 as a commercial or regulated activity
- Encourage parties to the London Protocol to ratify 2009 amendment allowing cross-border transport of CO_2 for offshore storage
- Encourage studies which appraise offshore transport infrastructure to identify infrastructure suitable for re-use

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Storage: business case and policy recommendations

- CO_2 storage operations lack a predictable and clear understanding of liability exposures
  - Current liabilities linked to future ETS price
- Upfront financial security arrangements and time-based monitoring increase cost and risk to CO_2 operator

Policy recommendations:

- Clarify the liabilities of CO_2 storage facility operators
- Governments can provide guarantees to the capture facility, e.g. Norway
- Encourage Member States to develop CO_2 storage atlases, as well as promote relevant geological and infrastructure information sharing

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Conclusions

- Separation of CCS and CCU value chain allows different business cases to develop, with economies of scale across the value chain
  - Capture clusters → shared CO2 transport and storage infrastructure
  - Ringfencing of risk allows targeted policy and support measures
  - Governments may take on early cross-value chain risk
- Public financial support is necessary until economies of scale are achieved
- Europe is well placed to take advantage of the benefits of CCS, given EU's ample CO2 storage capacity, existing subsea infrastructure, and wide range of European industries that could decarbonise by capturing, using and storing their CO2
- New and scale-able volumes of low carbon hydrogen with CCS will enhance the efficiency, sustainability and cost effectiveness of the future European gas market
- Future EU gas market regulation can support further deployment of CCS, CCU and low-carbon hydrogen, allowing the EU to benefit from these technologies