Managing Uncertainties in CCS: Patterns and/of Finance

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Summary

CCS ‘uncertainties’, Mark Hanna and financial viability

Graphical comparisons

Models of finance

Failure of C markets; validation of state support; or ongoing experimentation (“too soon to say”)?

*little evidence to justify going beyond the carbon market* (Delbeke, 2010)
Uncertainties
Uncertainties, Interlinked

Markusson N and others,
‘A Socio-Technical Framework for Assessing the Viability of Carbon Capture and Storage Technology’
(2012) 79 Technological Forecasting and Social Change 903

regulatory, technical, economic, political, societal and financial are **interlinked**

political, policy and regulatory decisions about policy support, carbon prices, carbon reduction goals, liability rules…etc. massively impact on the economic and financial viability and their associated risks. (911)
Regulation - one of few CCS ‘success stories’:

- encourage or stymie finance
- create mechanisms for finance, i.e. EU ETS/NER 300
- manage risk - investment cost, electricity price, fuel price, operational etc - i.e. CfD
- provide state subvention, i.e. hypothecation

How has it actually done so?
Mapping

Global CCS Map:

http://www.sccs.org.uk/expertise/map.html
Global CCS Projects: Snapshot

- Database analysed at end March 2014
- Total 203 entries
‘Status’ (NE) Asia
Comparison: ‘Storage’
Support Mechanisms
EU - Carbon Pricing

Carbon Price/EU ETS

• CEP principles: 20/20/20 on basis of cost-effectiveness, flex.,
  competition, subsidiarity, equity
• investment subsidy rejected ("the impact on positive
  externalities may not match the level of deployment subsidy"),
• but, co-financing of demonstrators ("R&D subsidy is a different
  matter")

NER 300

• C price too low/volatile (€5 instead of €39)
• 2014 - €9/t by 2020 (Point Carbon)
• First Call - €zero to CCS
• Second Call - diminished pot; stricken C price
Launched in 2007

- aimed to deliver 1st CCS project in 2014 (£1bn)
- 2011, £ to come from general taxation, not CCS levy
- Pulled in 2011. “5 wasted years” - E3G

Relaunched in 2012

- aiming to deliver in 2016-20 (Peterhead, White Rose)
- Support from CfD, inc FIT CfD for low carbon electricity
**USA**
American Recovery and Reinvestment Act 09 ($3.4bn) for CCS programs; Clean Coal Power Initiative (phased since 2002; $3.18bn in 2009); loan guarantees.

**Canada**
Saskatchewan, BC C taxes; Alberta Specified Gas Emitters Regulation (SGER)

Fed govt energy perf standards for coal fired power stations

Company partnerships with large provincial funding, some federal - grants and loan guarantees

**Both**
OER reduces cost of demonstrators by $15-30/t
China

12 FYP (2011-15)

Increased CCS support; 2009 Stimulus Package

April 2013, next 5YP provincial planning for CCS

Guandong - pilot low carbon province (2010). Largest ETS pilot (105m population, $1tn; 90GW peak electricity DD). CCS in Guandong started (surveys in 2005) in 2010

EOR since 2006

Bilateral support; MDBs
Conclusions
Ongoing process of experimentation

1st mover or 2nd mouse?

Volatile markets vs more stable state subvention ("little evidence to justify going beyond the carbon market")

broader role for C taxes, CfD?

what justification for direct support? (cf EU CBA)

EOR, supported by tax relief?

Completeness and adequacy?
Thank you.
Finance and Regulation

- Finance is an important aspect of CCS rollout
  - non-commercial
  - nor likely in short/medium term
  - ‘cost appraisal optimism’
‘Injection’ / quantum

Storage amount shown at source of CO₂, not storage location. See individual projects for detail on storage location.