The real costs of CCS
A project developer’s perspective

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CMI Eighth Annual Meeting
Princeton
February 2009
Our furthest advanced project is a 400MW gas fuelled plant in Abu Dhabi.
A site to the west of Abu Dhabi has been selected
A permit application has been submitted for our plant in Bakersfield, CA.
Early CCS plants carry a substantial cost premium over brown power, but not over other forms of low carbon power.

LCOE excludes:
- Carbon price
- Transmission costs
- Firming costs
- Financial support mechanisms

Assumed rate of return is 10%

Simplified pro-forma calculations – individual projects may lie outside these ranges.
By 2030 low carbon power may have converged to around $150/MWh, assuming adequate investment before then.
There is a substantial further source of value to the economy from projects with EOR.

CCS meets 3 policy objectives:

- Climate security
- Energy security
- Economic security

Increasing value of oil reduces value of power required to make whole chain economic.

Note: Issues with sink vs. plant location

Distribution of value in chain creates significant challenges.
CCS costs can be mitigated by scale, multiple value sources and appropriate commercial structures.

Hydrogen energy gasification plants: gas, petcoke, residues, coal → H2 network

H2 storage → refineries, fuel stations → chemical plants

CO2 network → EOR

Post-combustion capture
Other issues will affect the viability of individual projects

Capture rates

- Low capture rates may lock in emissions at levels incompatible with 2050 goals
- High capture rates may lead to different technology choices – need to demonstrate now?
- Incentives to move to higher capture rates now?

Fuel choice

- CCS applicable to e.g. liquid gasification and natural gas
- Incentives to recognise diversity of project fuel choices?

Roll out

- How many plants needed for convergence to carbon price?
- Form of incentives required as successive generations of plant are built?
- Which part of the chain rewarded?