Research priorities for achieving a 50% reduction in cost of CO$_2$ capture

*Presented at: Carbon Capture and Storage: What role for R&D in delivering cost-competitive CCS projects in the UK in the 2020s*

Aniruddha Sharma
CEO

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About CCSL

- Founded in 2009, 6 patents filed in 10 countries; commercial sales
- Technology: Amine replacing APBS solvent + process design
- Impact: £52/tCO₂ → £37/tCO₂ (achieved) → £30/tCO₂ (3 year)
- Grant funding from UK DECC & US DOE; proven at 3 pilots & 4 commercial sites
- Operational at TCM Mongstad from 15/11/15
- FEED for 175tons/day CO₂ capture plant (coal flue gas)
Target LCOE increase reduction

- 40% due to energy
  - Solvent regeneration
    - Increased fuel & electricity
    - Cooling water
  - Regeneration energy
  - Solvent Circulation
  - Degradation & Make-up
  - Emissions

- 60% due to capital costs
  - Size & material of construction
    - Expensive MoC
    - Large Equipments
  - Equipment size
  - Corrosion
  - MoC requirements
  - O&M

Reduce opex ~ 50%
Reduce capex ~ 35 - 40%

Source for LCOE breakup: 2014/TR4 Assessment of emerging CO2 capture technologies and their potential to reduce costs; LCOE: Levelized Cost of Electricity
CCS’s approach for cost reduction

Cost components →

£59/Tonne → £116/MWh

Reduced Regeneration Energy: £4.2
Reduced Auxiliary Electrical Load: £4
Reduced Equipment Size and Reduced Capex: £6.1
Lower Corrosion Rates: £4.5
Reduced O&M: £1.7
Reduced risk premia & process intensification: £8.4

Cost £/Tonne

Source for FID cost (2013): CCS Cost Reduction Task Force
Research Priorities

- Grants to establish future full scale projects
- Understanding of clusters and dynamic operation
- Process intensification / new process for capture / waste reuse/new material
In case you wish to capture some CO₂....

Aniruddha Sharma, CEO &
aniruddha@carboncleansolutions.com
Mobile: +44 7552309420

47 Castle Street, Reading RG1 7SR, Berkshire,
United Kingdom