Why We Need Carbon Capture and Storage (CCS)

Tim Dixon, IEAGHG
10th November 2016
Green Zone Event
COP-22, Marrakech
IPCC Fifth Assessment Report
Synthesis Report

2nd November 2014
Copenhagen
Key Messages

→ Human influence on the climate system is clear.

→ The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts.

→ We have the means to limit climate change and build a more prosperous, sustainable future.
The Choices We Make Will Create Different Outcomes

With substantial mitigation

Without additional mitigation

Change in average surface temperature (1986–2005 to 2081–2100)
Sources of emissions

Energy production remains the primary driver of GHG emissions.

- **Energy Sector**: 35%
- **Agriculture, forests and other land uses**: 24%
- **Industry**: 21%
- **Transport**: 14%
- **Building Sector**: 6.4%

2010 GHG emissions
Mitigation Measures

More efficient use of energy

Greater use of low-carbon and no-carbon energy
- Many of these technologies exist today

Improved carbon sinks
- Reduced deforestation and improved forest management and planting of new forests
- Bio-energy with carbon capture and storage

Lifestyle and behavioural changes
IPCC AR5 – Role of different low-carbon energy technologies

Mitigation cost increases in scenarios with limited availability of technologies

\[
\text{% increase in total discounted mitigation costs (2015–2100) relative to default technology assumptions}\]

<table>
<thead>
<tr>
<th>2100 concentrations (ppm CO$_2$-eq)</th>
<th>no CCS</th>
<th>nuclear phase out</th>
<th>limited solar/wind</th>
<th>limited bioenergy</th>
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<tbody>
<tr>
<td>450 (430 to 480)</td>
<td>138% (29 to 297%)</td>
<td>7% (4 to 18%)</td>
<td>6% (2 to 29%)</td>
<td>64% (44 to 78%)</td>
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IPCC AR5 SYR from Table 3.2 (2014)
The momentum from COP21 needs to be accelerated to reach 2DS ambitions

Contribution of technology area and sector to global cumulative CO₂ reductions

Actions need to be pursued by stakeholders in all sectors to achieve an optimal transition strategy.
Electricity generation needs to be almost completely decarbonised in the 2DS, from a CO₂ intensity of around 530 g/kWh today to less than 40 g/kWh by 2050.
IEA vision: 120 Gt of CO₂ stored by 2050

**Goal 1: 2020**
Over 30 large projects in operation in power and across a range of industrial processes, storing 50 MtCO₂ per year.

**Goal 2: 2030**
Over 2 GtCO₂ is stored per year. CCS routinely used in power and certain industrial applications.

**Goal 3: 2050**
Over 7 GtCO₂ stored per year. CCS routinely used in all applicable power and industrial applications.
‘Climate Action Now’
UNFCCC - 18 Nov 2015

- High level summary of policy actions with high mitigation potential at 2020
- Builds on Technical Expert Meetings (TEMs)
- Includes CCUS as one of the six priority areas
- Significance of Boundary Dam CCUS project
- Solutions through international cooperation - IEAGHG
Global CCS Update

- Very Active region
  - R&D/Pilots

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- Developing Interest
  - R&D/Pilots

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