GLOBAL CCS INSTITUTE
Bob Pegler, General Manager – Europe
PROJECT STATUS, May 2011
GLOBALLY, CCS PROVIDES ~20 per cent OF CO₂ MITIGATION BY 2050

ACCELERATING PROJECT DEVELOPMENT

An IEA view - Based on CCS Roadmap

Captured CO₂ (MtCO₂/yr)

- OECD PACIFIC
- USA
- OTHER OECD N AM
- OECD EUROPE
- ODA
- ME
- INDIA
- EEU + FSU
- CSA
- CHINA
- AFR

2015
18 projects
OECD (72%)
Non-OECD (28%)

2020
100 projects
OECD (50%)
Non-OECD (50%)

2030
850 projects
OECD (49%)
Non-OECD (51%)

2040
2,100 projects
OECD (40%)
Non-OECD (60%)

2050
3,400 projects
OECD (35%)
Non-OECD (65%)
THE INSTITUTE IS A KNOWLEDGE SHARING ORGANISATION

OVERARCHING OBJECTIVE
“To accelerate the broad deployment of commercial CCS”
GLOBAL CCS INSTITUTE

To accelerate the development and deployment of CCS globally so that CCS plays a significant role in reducing GHG emissions

1. ASSISTING PROJECTS
   • Bridging between demonstration efforts
   • Developing project-specific solutions for early movers

2. SHARING KNOWLEDGE
   • Sharing real experiences, filling knowledge gaps and building capabilities

3. FACT-BASED ADVOCACY
   • Increasing awareness of CCS
   • Informing and influencing policy
   • Advancing financing solutions and risk regimes
INSTITUTE SUPPORTED PROJECTS

Project Pioneer, TransAlta
- FEED studies
- AU$5 million

Rotterdam CCS Network Project, RCI
- Storage and shipping studies
- AU$2.2 million

Romanian CCS Demonstration Project, ISPE
- Feasibility Study
- AU$2.55 million

CarbonNet, Victorian Government
- Commercial and Planning studies
- AU$2.3 million

Tenaska Trailblazer Energy Center
- FEED studies
- AU$8.03 million

Tenaska/Entergy Nelson 6 CCS Project
- FEED studies
- AU$825,600 (Phase 1)

Callide Oxyfuel Project, OPTL*
- Transport and CO$_2$ injection studies
- AU$1.83 million

* Letter of Intent

3 in North America, 2 in Europe, 2 in Australia. Commitment ~ AU$23 million
WE DRIVE KNOWLEDGE THROUGH FUNDING, RESOURCES AND CONNECTING EXISTING NETWORKS

Global CCS Institute

Project Networks

Thematic Groups (e.g. Hubs)

Existing networks

Projects

Embedded knowledge personnel

European projects

Australian projects

Nth American projects

Supported projects and partners

Other digital platforms (e.g. DoE)

Digital platforms
RECENTLY RELEASED PRODUCTS

CCS Regulatory Test Toolkit (February 2011):
- Ensuring best practice regulations and permitting processes.

Tenaska Trailblazer reports (January 2011):
- Project development history;
- CO₂ technology selection process; and
- Public engagement.

Tenaska Nelson 6 reports (January 2011):
- Project development history.

All reports supported by the Global CCS Institute.
OVERARCHING OBJECTIVE

“To accelerate the broad deployment of commercial CCS”
234 ACTIVE AND PLANNED PROJECTS: 
BY SECTOR AND LIFECYCLE STAGE

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Legend:
- Identify
- Evaluate
- Define
- Execute
- Operate
77 LSIPS BY INDUSTRY SECTOR, STORAGE TYPE AND LOCATION
LSIPS BY SECTOR

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<th>CO₂ stored (Mtpa)</th>
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<td>Iron and steel production</td>
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Legend:
- Turquoise: In development
- Grey: Construction
- Green: Operation

Number of projects:
- Power generation: 42
- Gas processing: 11
- Synthetic natural gas (SNG): 5
- Coal-to-liquids: 3
- Fertiliser production: 3
- Oil refining: 2
- Ethanol plant: 1
- Cement production: 1
- Pulp and paper: 1
- Hydrogen production: 1
- Iron and steel production: 1
- Various: 6
## LISPS BY ASSET LIFECYCLE

<table>
<thead>
<tr>
<th>Region</th>
<th>Identify</th>
<th>Evaluate</th>
<th>Define</th>
<th>Execute</th>
<th>Operate</th>
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<tr>
<td>Australia and New Zealand</td>
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<td>5</td>
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<td>Middle East and Africa</td>
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<tr>
<td>Asia (excl. China)</td>
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<td><strong>Total 2010</strong></td>
<td><strong>10</strong></td>
<td><strong>28</strong></td>
<td><strong>27</strong></td>
<td><strong>4</strong></td>
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<tr>
<td><strong>Total 2009</strong></td>
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<td><strong>20</strong></td>
<td><strong>15</strong></td>
<td><strong>2</strong></td>
<td><strong>8</strong></td>
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</table>

**Graph:**
- The bar chart shows the number of projects by asset lifecycle phase for different regions.
- The total number of projects for 2010 is 77, and for 2009 is 64.
GLOBAL STATUS: LESSONS LEARNED

- CCS is primarily a policy/commercial issue, not a technical issue
  - Projects getting stuck at Financial Close:
    - Lack of value proposition (even EOR is not sufficient)
    - Costs of CCS
    - Lack of value for CO$_2$
  - More work therefore required on policy and regulatory regimes
- Developers have better alternatives (given current value proposition and incentives)
- Onshore storage faces significant public acceptance issues and this is often underestimated
- Storage characterisation takes time and money
EUROPEAN SNAPSHOT

- Robust number of projects – interesting emergent projects from NER300;
- The United Kingdom and the Netherlands are the most active;

But

- Clear political support is limited to a small number of countries;
- Onshore storage faces significant public acceptance issues;
- Renewed interest in gas (without CCS) for electricity generation;
- Limited effort on industrial CCS – but unexpected strong response in NER300 (4 projects);
- Transbounday CO2 movement – liability, limitations and leverage;