

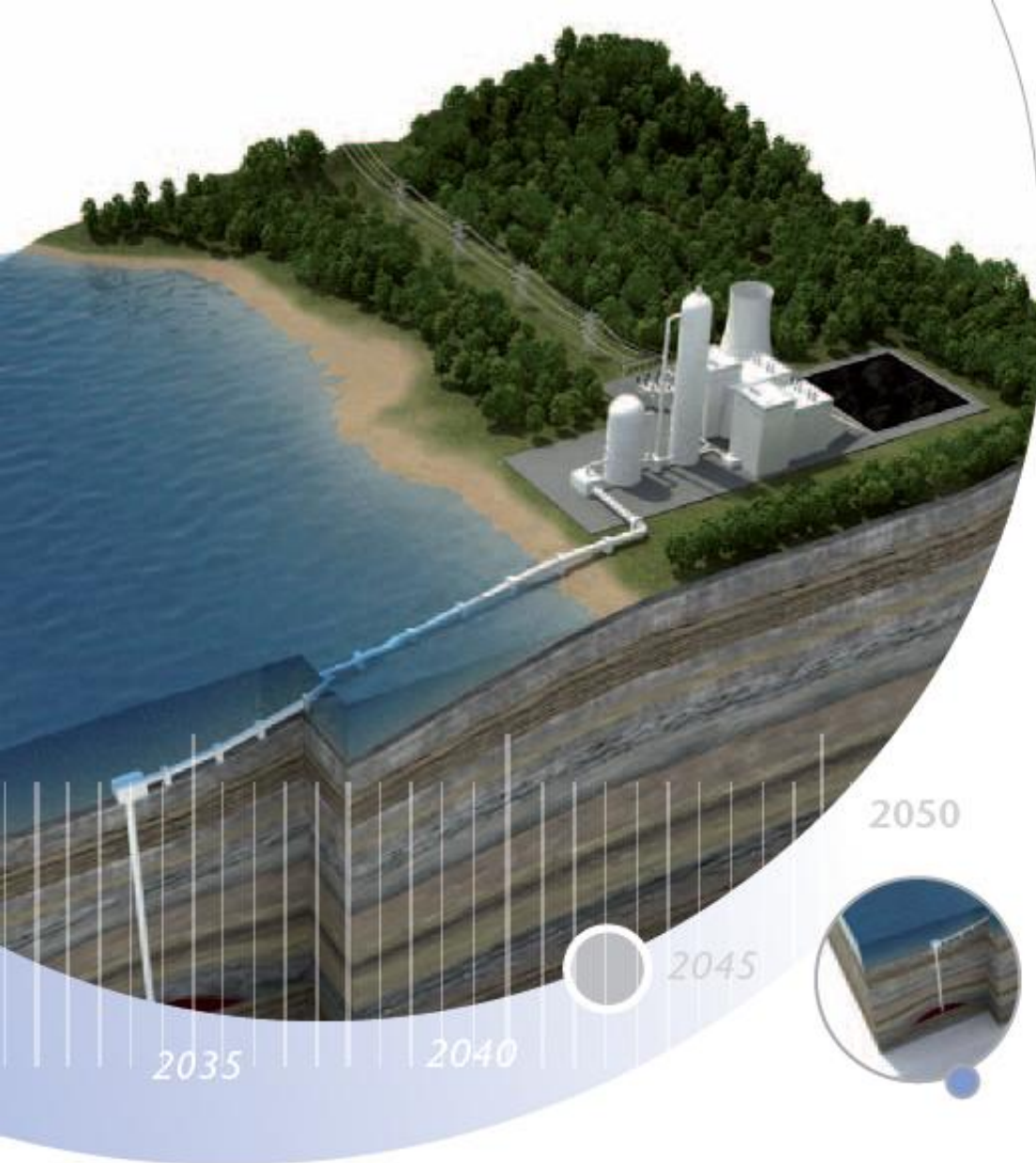
Please note that this presentation was given during the United Nations Climate Change Conference (COP-15) in Copenhagen, December 7-18, 2009 for more information please visit <http://www.cop15.state.gov/>.

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Technology Roadmap

Carbon capture and storage



CCS: An IEA roadmap to achieving climate goals

Stefanie Held
International Energy Agency

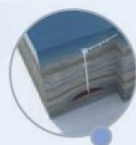
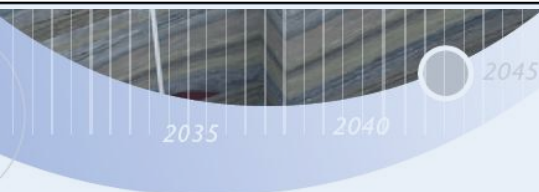
Technology Roadmap

Carbon capture and storage

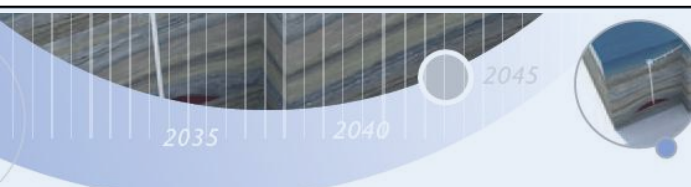
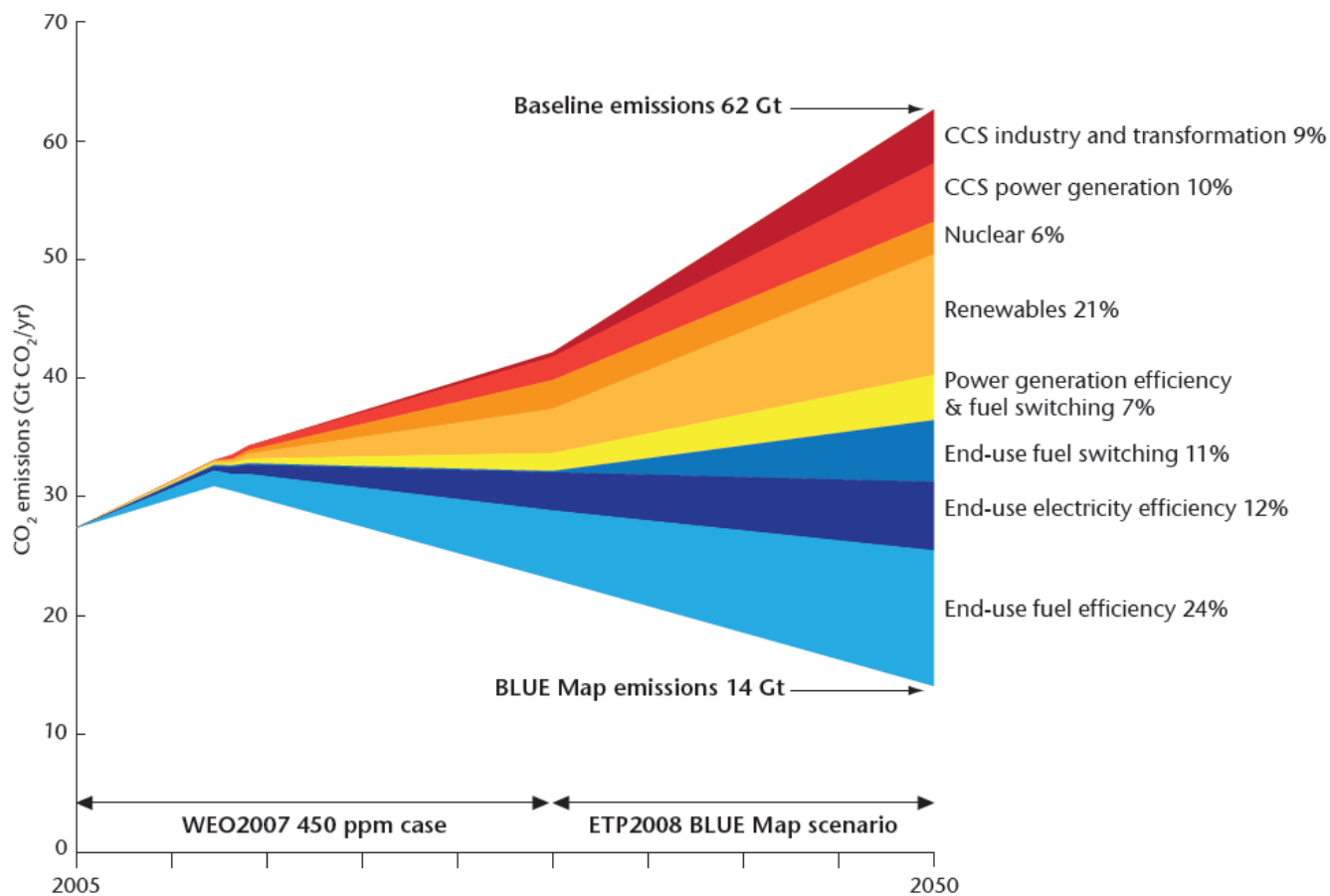
The rationale for CCS



- Without new policies, global emissions increase by 130% by 2050, leading to a 4-7°C temperature rise
- CCS provides one-fifth of the needed CO₂ reductions in 2050
- Without CCS, cost of stabilization rises by 70%
- CCS is the only low-carbon solution for gas/coal, cement, and iron & steel sectors



The ETP BLUE Map scenario



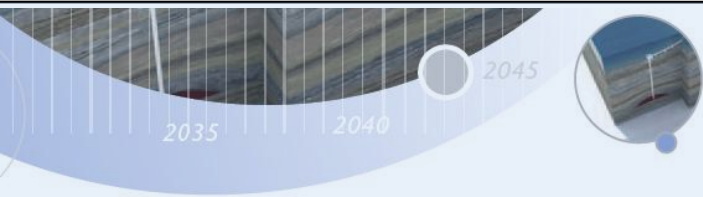
Technology Roadmap

Carbon capture and storage

The roadmap process



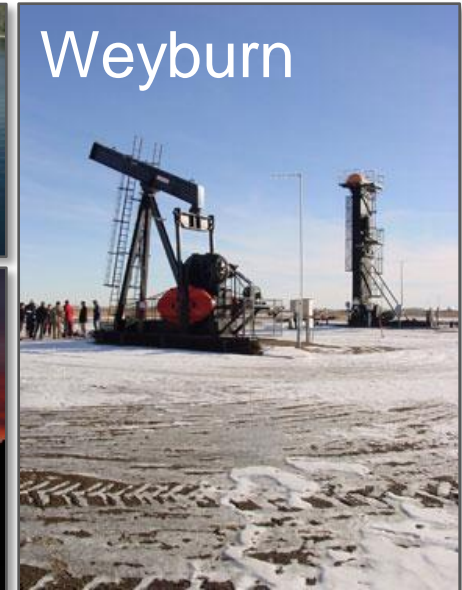
- IEA is developing technology roadmaps for key low-carbon energy technologies
- Process begins by convening experts to establish the current technology baseline
- Assume a 50% reduction in energy-related CO₂ by 2050
 - Use BLUE Map scenario to map growth pathway
- Create technical, policy, legal, financial, and public acceptance milestones to achieve 2050 targets
- Identify priority near-term actions
- Create a process for enhanced collaboration
- Implement actions and track progress



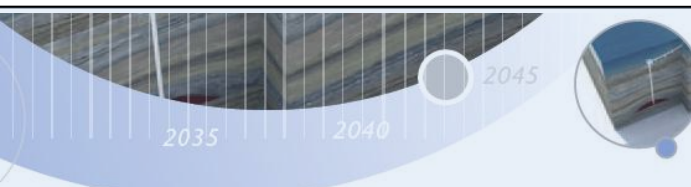
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Carbon capture and storage

CCS is operating today



*Need to rapidly demonstrate CCS at scale;
70+ projects are planned worldwide*



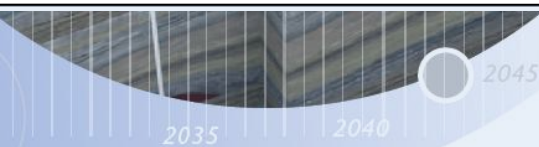
Technology Roadmap

Carbon capture and storage

CCS financing today



- Australia: Aus\$2bn; Aus\$300 for GCCSI
- Canada: Can\$1.3bn; Can\$2bn from Alberta
- EU: €1.05bn from Economic Recovery Energy Programme and 300m allowances in the EU ETS
- Japan: JPY10.8bn
- Norway: ~US\$40/tonne CO₂ tax on offshore oil and gas operations; NOK1.2bn government investment
- UK: GBP 7.2-9.5 billion to cover additional costs for 1-4 CCS plants raised thru levy on electricity suppliers
- US: US\$3.4bn from Economic Recovery Act; US\$3.3bn in other federal government RD&D support



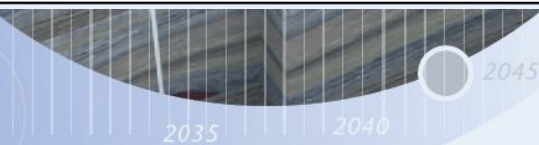
Technology Roadmap

Carbon capture and storage

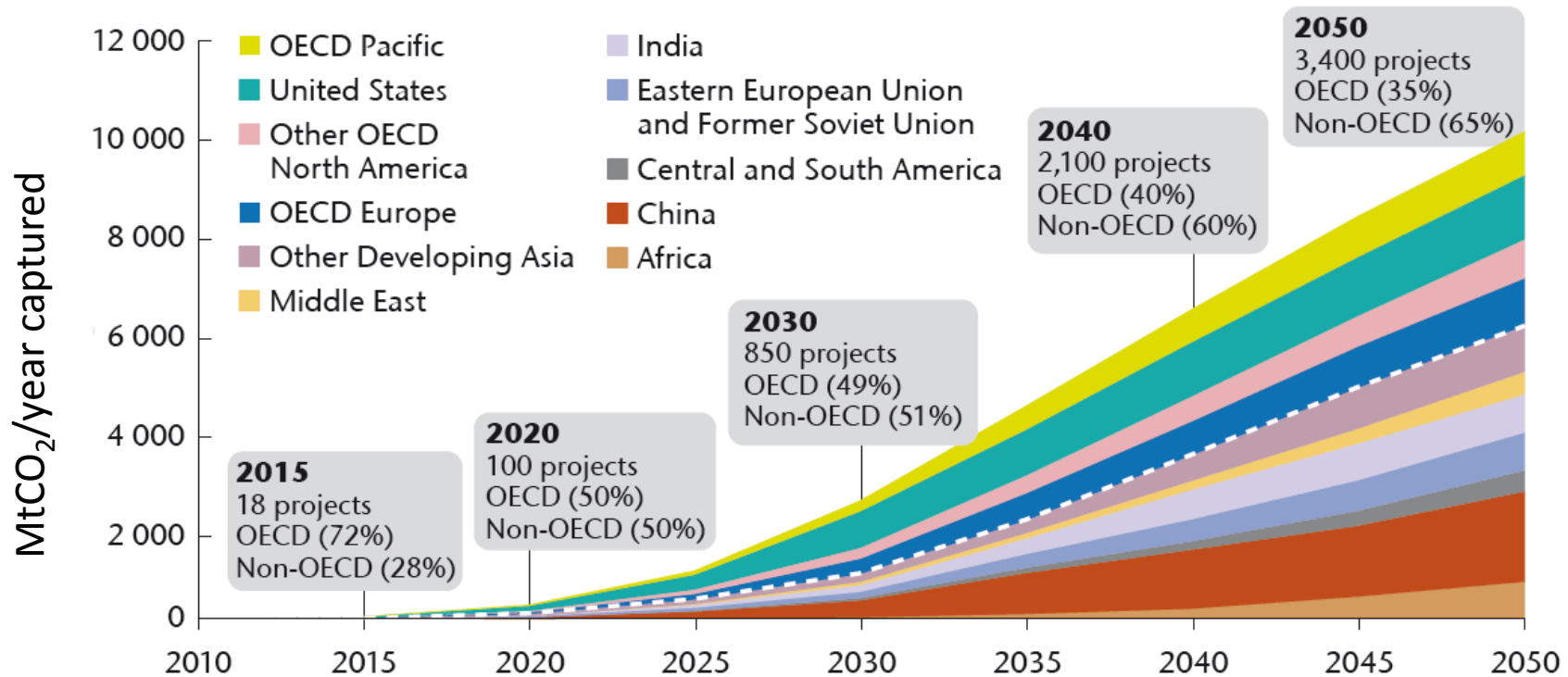
CCS laws and regulations today



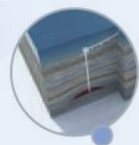
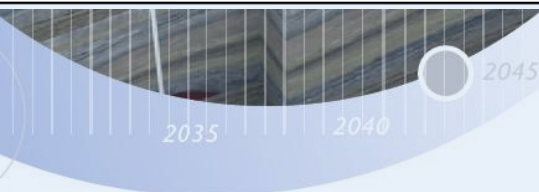
- IPCC 2006 *Inventory Guidelines*
- London Protocol, OSPAR treaty amendments
- EU CCS Directive, EU ETS Directive
- National legal & regulatory developments
 - Australia has a comprehensive framework
 - US, Canada, Japan, Norway more piecemeal
- UNFCCC
 - CCS does not qualify under the CDM



An ambitious growth pathway



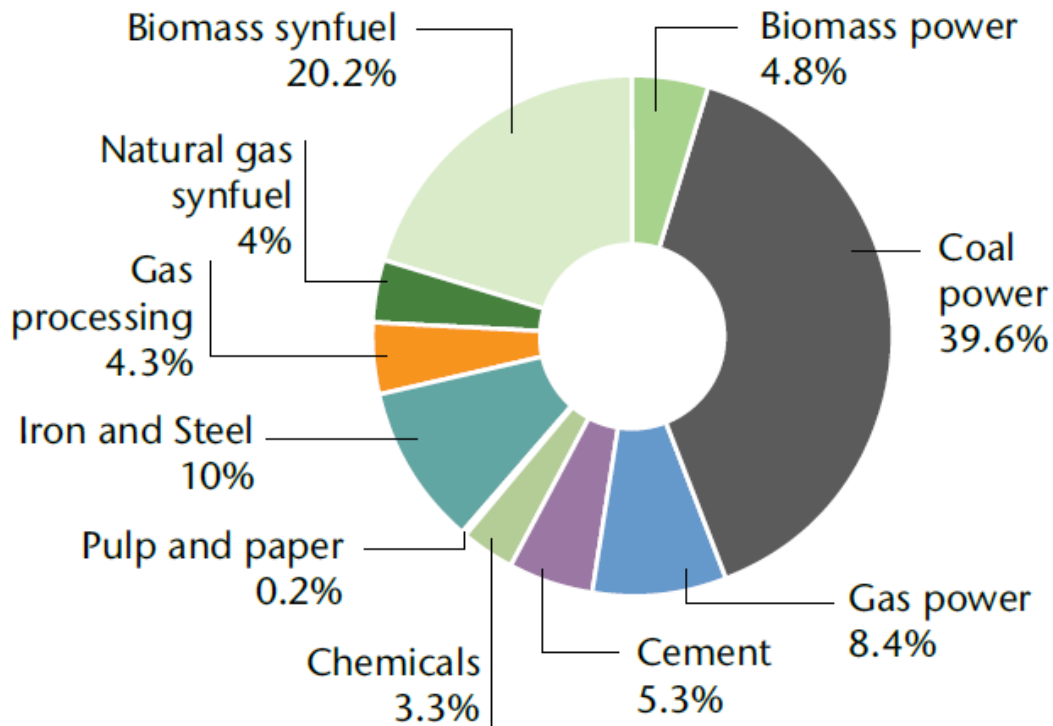
*OECD regions must lead in demonstrating CCS,
but the technology must quickly spread to the rest of the world*



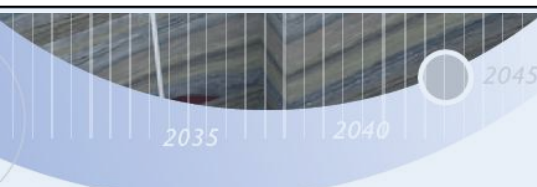
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CCS is not just about “clean coal”



Coal power makes up around 40% of stored emissions in 2050



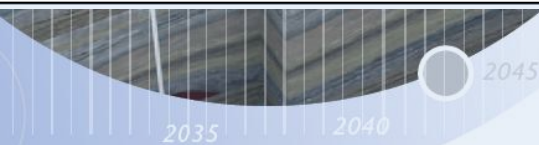
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Carbon capture and storage

The next ten years: a critical period for CCS



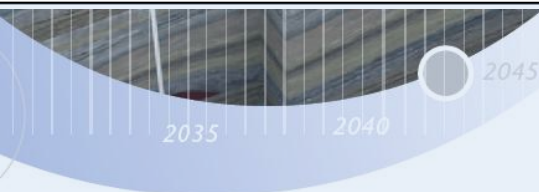
- **Demonstration milestones**
 - Meet G8 goal of 20 project announcements by 2010
 - Achieve commercialisation with 100 projects by 2020
- **Financial milestones**
 - Provide USD42 bn for near-term demonstrations; also need to fund longer-term R&D
 - Finance and plan CO₂ transport infrastructure
 - Incentivise CCS via bonus allowances in cap-and-trade schemes, emissions performance standards or carbon taxes



The next ten years: a critical period for CCS



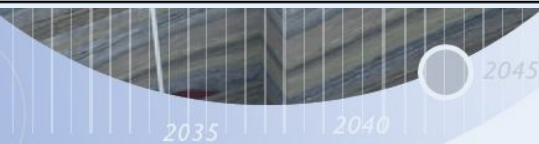
- **Legal/regulatory milestones**
 - Amend existing frameworks to regulate demonstration projects
 - By 2015, all countries with CCS potential should have comprehensive frameworks
- **Public engagement milestones**
 - Increase government investment in outreach in 2010-2012
 - Provide greater (and earlier) information on planned projects



The next ten years: a critical period for CCS



- **International development milestones**
 - By 2050, non-OECD regions will account for 64% of captured CO₂
 - By 2050, China and India will account for around 26% of the cumulative CO₂ captured
- Expand capacity building efforts in non-OECD countries with fossil fuel economies such as China, India, South Africa
- An average annual investment of \$1.5-2.5bn between 2010-20 in non-OECD regions



For more information



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