



CCS: A look Ahead

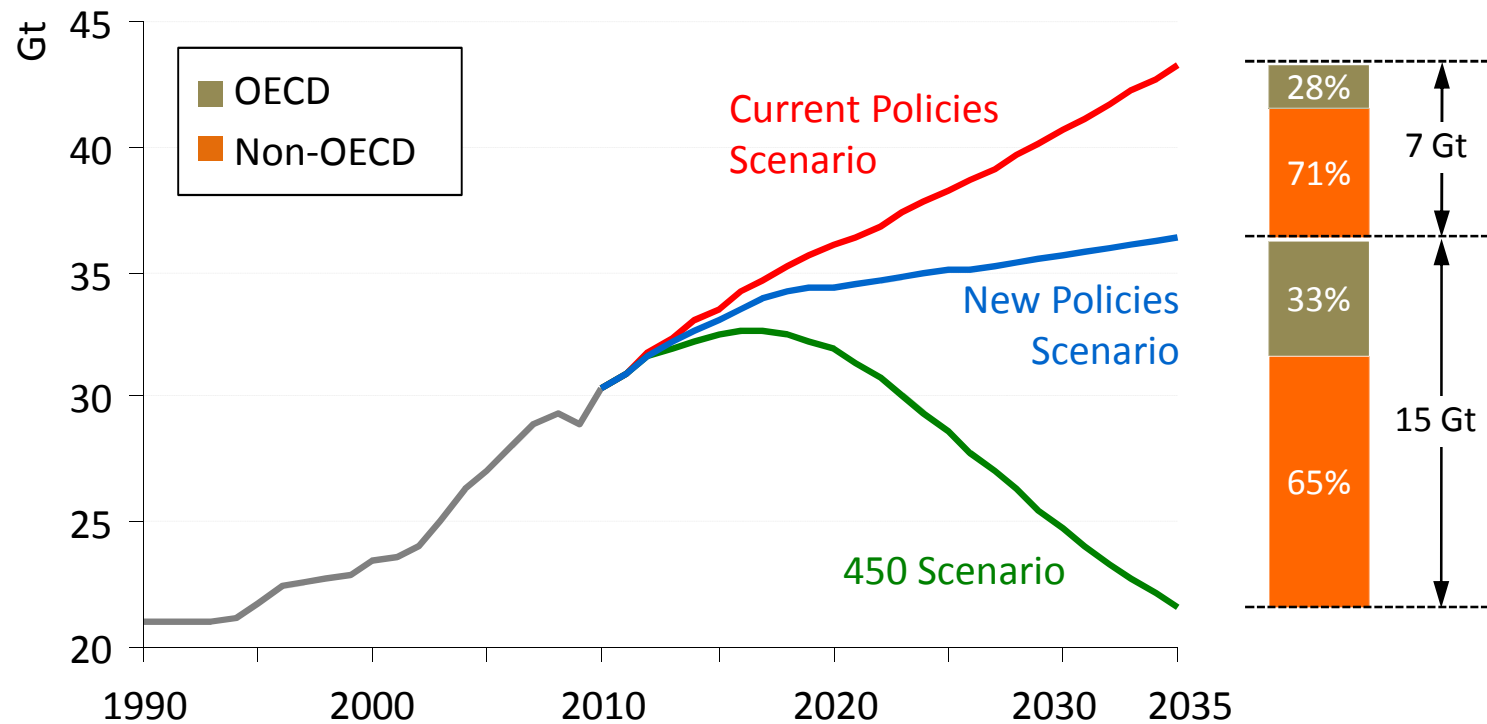
Tim Dixon

IEA Greenhouse Gas R & D Programme

UKCCSC Winter School 11 Jan 2013

The 450 Scenario illustrates what the 2°C goal will require

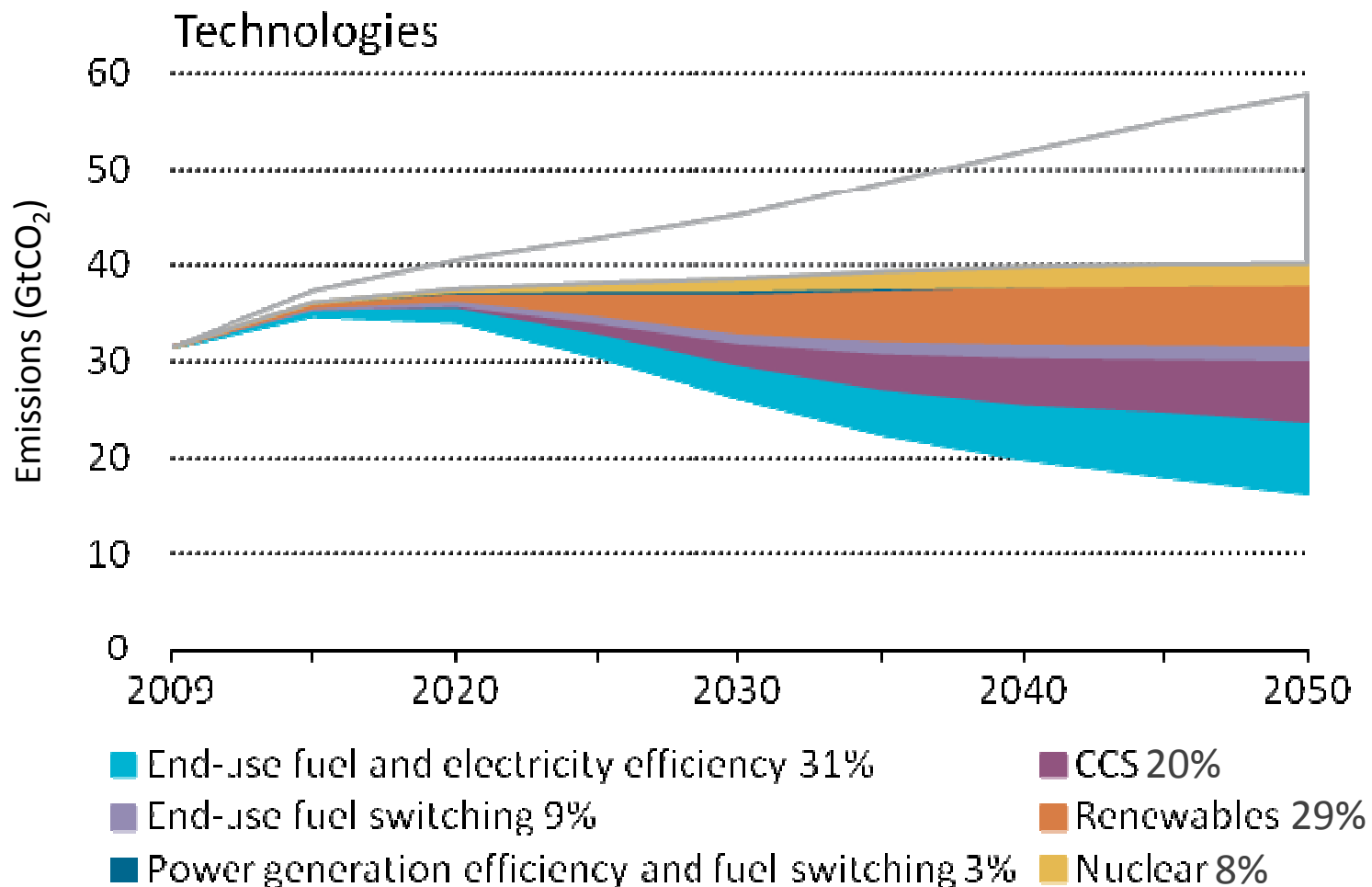
World energy-related CO₂ emissions by scenario



Restricting the greenhouse-gas concentration to 450 ppm would limit temperature increase to 2°C, compared with 3.5°C in the New Policies Scenario & 6°C in the Current Policies Scenario

Wanted: clean energy technologies

ETP
2012

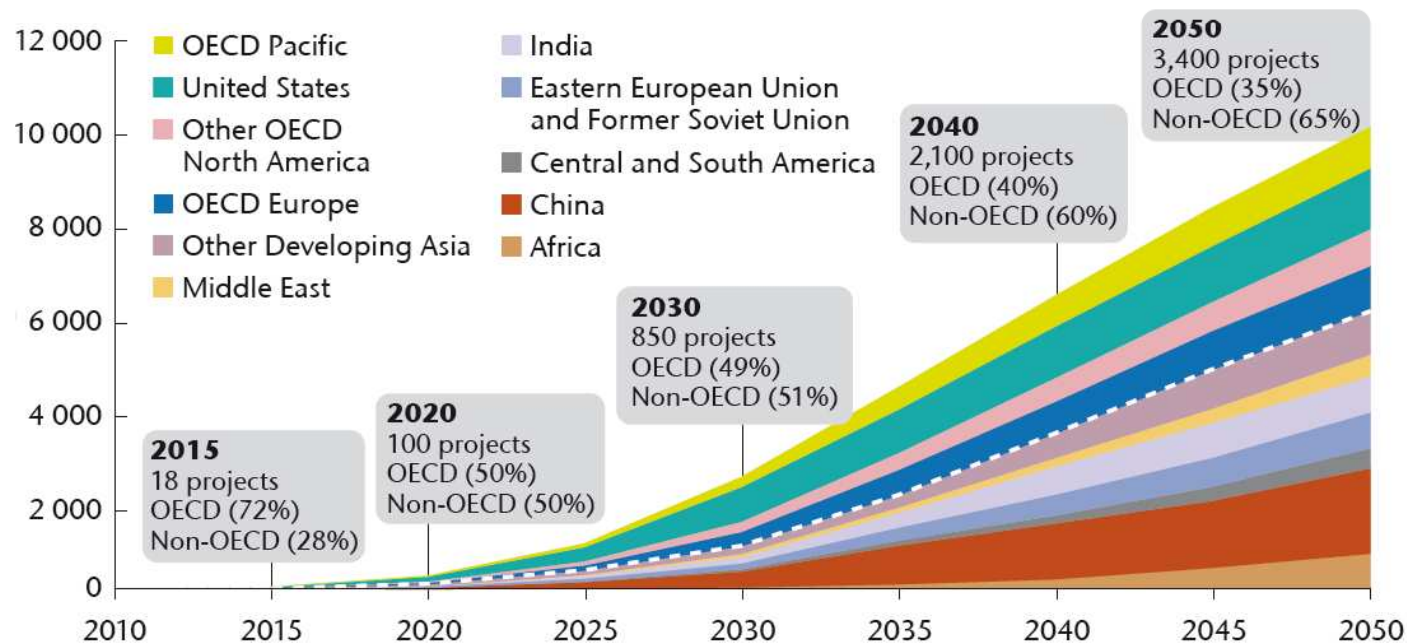


Carbon capture and storage (CCS) contributes one-fifth of total emissions reductions through 2050

IEA Roadmap and G8 targets



- Energy demand continues to grow: +35% by 2035; CO₂ emissions continue to grow: current pathway is towards 650ppm
- G8 - 20 CCS projects by 2020; IEA - 100 CCS projects by 2020 under blue map scenario (450ppm)



Are we on target?



- IEAGHG/GCCSI Storage Gap Analysis study shows G8 target of 20 projects by 2020 is possible if adequate resources provided & if CO2-EOR projects are included
- However, IEA Roadmap target is unattainable
- Storage project lead times are long - up to 15 years for deep saline formations.
- Based on projections 50 projects possible by 2025 with adequate funding or with CO2-EOR 100 projects by 2028 (needing 6 billion Euro of investment).
- Without sufficient funding, gap between targets and number of projects will widen.

(2011)



Challenges Remaining



- Economic Downturn
 - CCS benefits
 - US Economic stimulus package in 2009 allocated \$3.5bn to CCS
 - EU Economic Recovery Plan, 2008
 - €1 billion for CCS projects
 - EU ETS/NER300
 - Fund more CCS demos
 - 13 projects submitted, selection October 2012
 - Economic downturn – defending the above wrt large cuts in government budgets. Also impacts climate change mitigation strategies in general



Challenges Remaining



BURIED TROUBLE

Investors saying "no to CO₂" are just one roadblock facing carbon sequestration — a strategy that could help prevent dangerous climate change. **Richard Van Noorden** investigates.

Idea of injecting 400,000 tonnes of carbon dioxide under a shopping mall was always going to be a tough sell. And so it proved when the Dutch minister of Economic Affairs, Maria van der Hoeven, came to Barendrecht in December to explain why she had rejected the proposal, made by the petro-

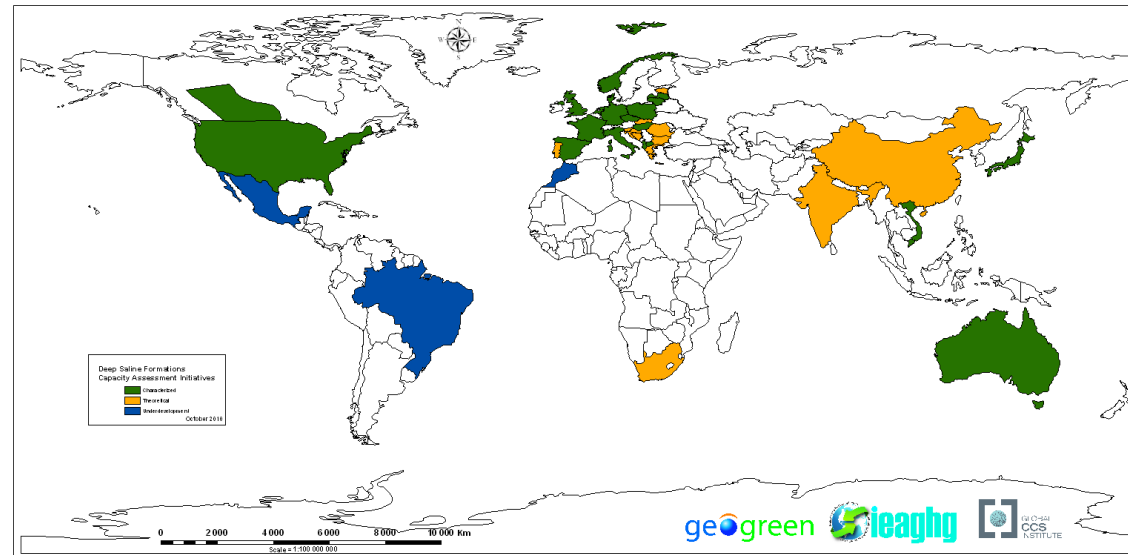
investors are uncertain about its viability at large scale. "There is lots of research and lots of talking about recycling of information — but little real practice," says Heleen de Coninck, who works on climate change at the Energy research Centre of the Netherlands. "That slow pace is especially harmful because the strategy has a limited life-

- Public acceptance
 - Public opposition contributed to stopping CCS projects including Barendrecht
 - BUT, lessons learnt have contributed to several best practice guidelines for communication practice

PROJECTS NEEDED!



Challenges Remaining



- **Technical**

- Capture plant scale up and cost reduction
- Storage injectivity and capacity
- CO2-EOR projects may enable targets to be met, BUT deep saline formations offer the greatest capacity potential.

PROJECTS NEEDED!

What's next for CCS?



- Demo projects planned but when will these be operational?
 - How will these be impacted by changing economic & political environments?
- Shift to the developing world?
 - Economic downturn
 - CCS in the CDM Modalities and Procedures - benchmark for managing CCS projects in developing countries: growing regulations & projects in developing countries?
 - Also, Green Climate Fund - developing countries for both mitigation and adaptation activities

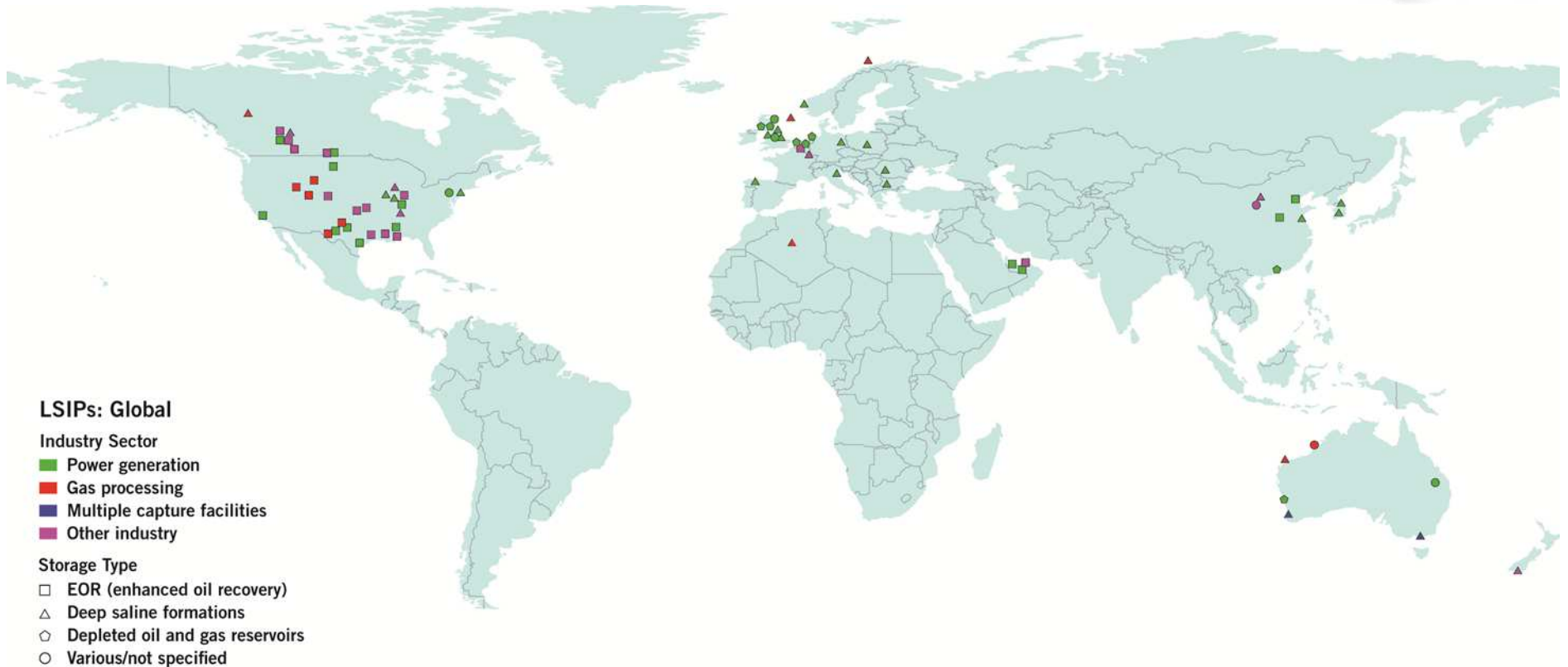
What's next for CCS?



- Experience & Refinement of regulations
- Engagement with experience
- CCS in Industry
 - CCS could reduce 4 Gt of CO₂ emissions from industrial sources by 2050
 - Further support for CO₂-EOR due to revenue stream? If so, how will that influence stakeholder opinion?
 - Bio-CCS – low hanging fruit and stakeholder support?
 - Incentives needed for negative emissions



Global spread of projects



- Concentrated in North America, Europe, Australia & China
- US & Europe account for 62% of LSIPs (GCCSI 2011)

7th IEAGHG International CCS Summer School 2013



- **Hosts:** University of Nottingham, UK
- **Provisional dates:** 21st – 26th July 2013
- **Deadline:** 28th February 2013

www.ieaghg.org





What do you think?

Thank you