

# CCS @ IEA

CSLF Policy Group  
7 October 2010

Juho Lipponen  
Head of CCS Unit

## Technology Roadmap

Carbon capture and storage

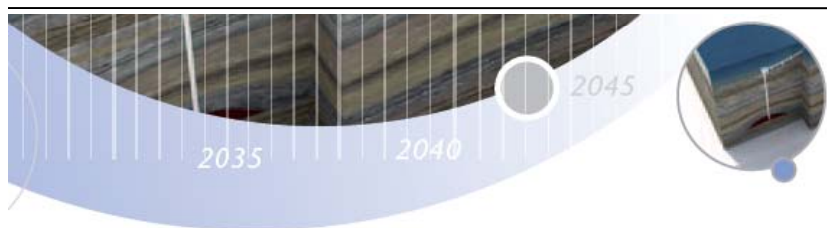


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**To keep global temperature increase  $<2^{\circ}\text{C}$ , the world can emit 1000 GtCO<sub>2</sub> between 2000-2050.**

**Today 1/3 of this budget is already gone.**

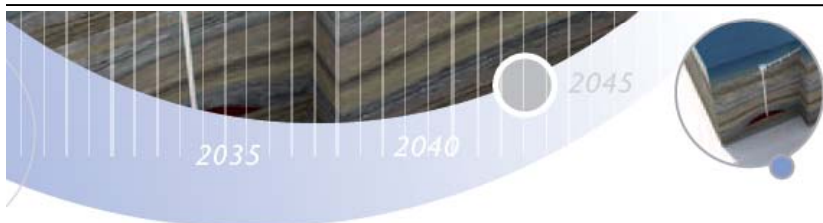
source: Potsdam Institute for Climate Impact Research



# CCS @ IEA: "COMPETITIVE ADVANTAGES"



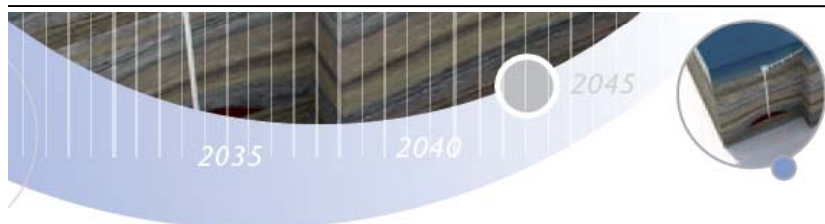
- Inter-governmental
- All aspects of energy policy, all technologies
- Strong tradition in legal, regulatory & policy work
- Analytical foundation and global energy scenario capability: putting CCS in context
- Strong capacity building and outreach culture
- New team capable of rapidly expanding knowledge to technical, economic, social etc. issues



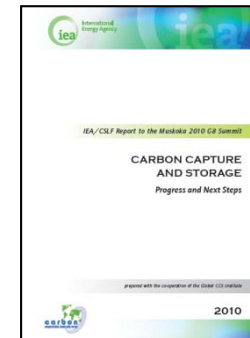
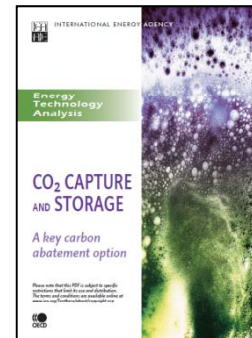
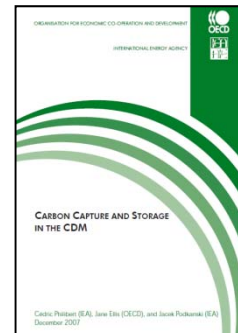
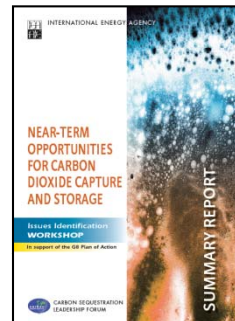
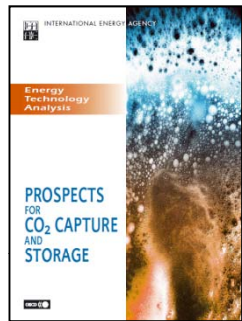
# CCS NOT A NEW ACTIVITY @ IEA



- Contribution to in-house analysis (ETP, WEO etc.)
- CCS-specific analysis and publications
- Active input to G8-G20-MEF-CEM processes
- Outreach to non-OECD countries
- Networking: IEA CCS Regulators Network
- Webinars, website, articles, presentations etc.
- IEA Working Party on Fossil Fuels
- CERT, SLT, CIAB
- IEA GHG R&D Programme and the Clean Coal Centre



# PUBLICATIONS TO DATE



2004

2005

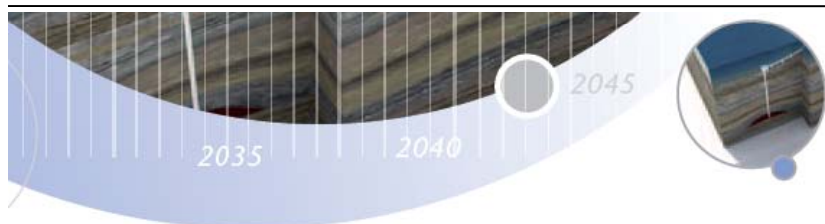
2006

2007

2008

2009

2010



# “Lighthouse”: the 2009 Roadmap

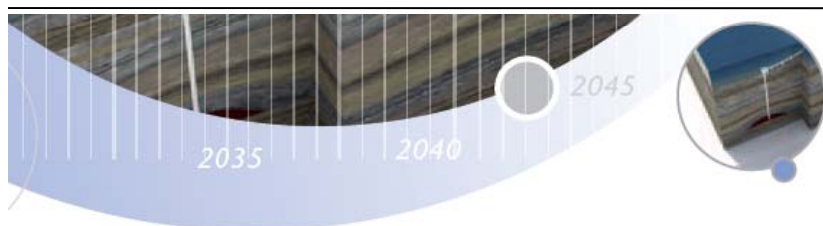


Deployment path

Milestones

Recommendations

**NOT ONLY A *TECHNOLOGY* ROADMAP!**



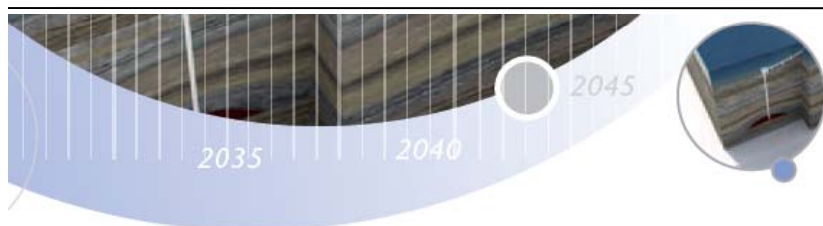
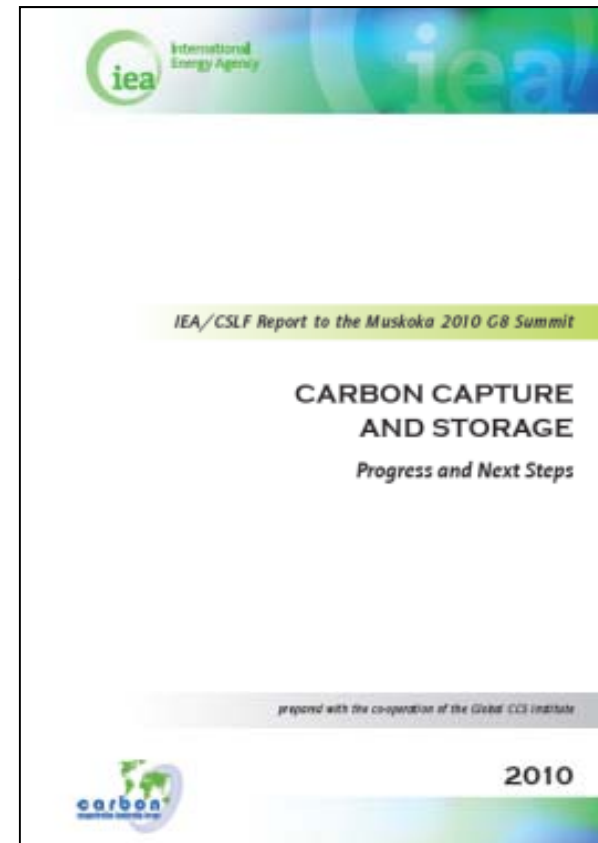
# June 2010 report for G8: “CCS: Progress and Next Steps”



Recap of G8 ambitions

Progress towards G8  
recommendations

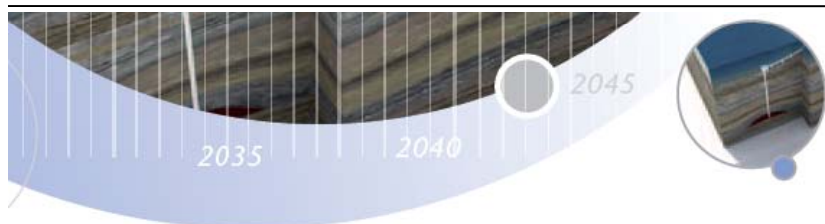
Next steps



# STEPPING UP CCS @ IEA: NEW DEDICATED TEAM

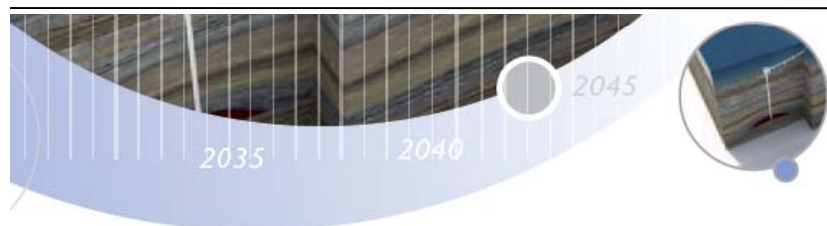


- Team complete as of 1 July 2010
- Team composition:
  - Head of Unit
  - 6 Energy Analysts; 4-5 analysts elsewhere in IEA
  - Team assistant
- VC from Australian government / GCCSI until end-2012

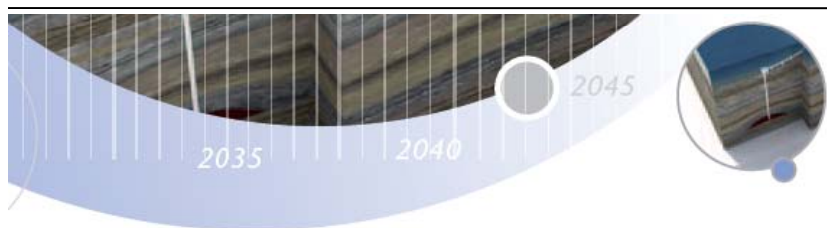
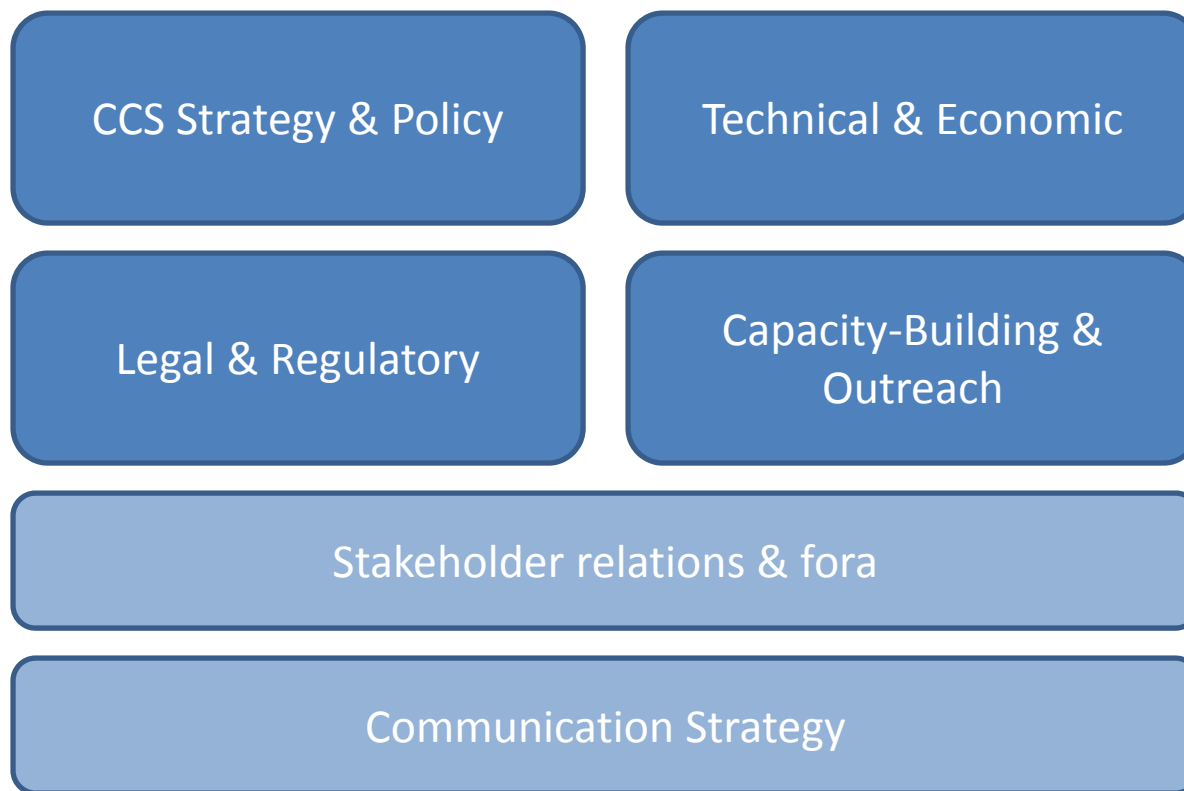




# CCS @ IEA: WORKING CONNECTIONS



# CCS @IEA: WP CORNERSTONES



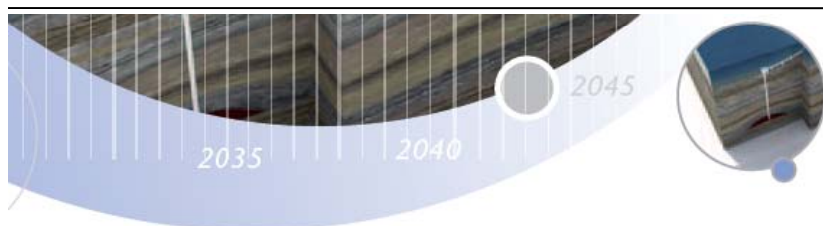
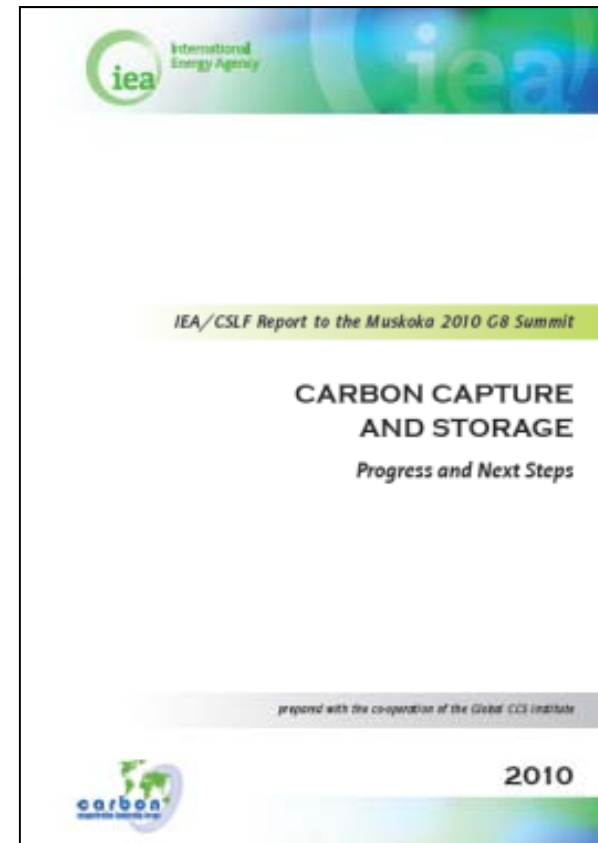
# June 2010 report for G8: “CCS: Progress and Next Steps”



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Progress towards G8  
recommendations

Next steps



# G8 GOALS

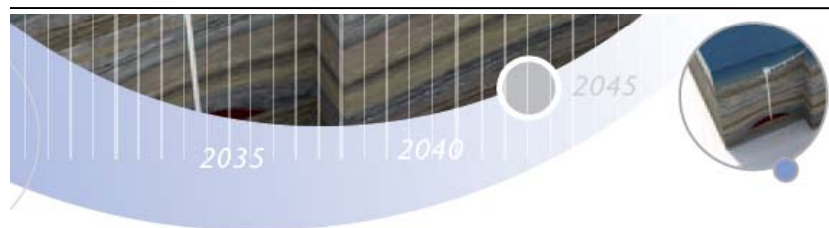


- In 2008, at the Hokkaido Toyako Summit, G8 leaders affirmed:

*“We strongly support the launching of 20 large-scale CCS demonstration projects globally by 2010, taking into account various national circumstances, with a view to beginning broad deployment of CCS by 2020.”*

- In 2009, at the L'Aquila Summit, G8 leaders reaffirmed:

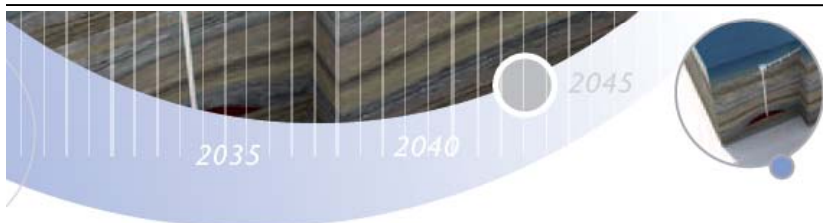
*“...the commitment made in Toyako for the launch of 20 large-scale Carbon Capture and Storage demonstration projects globally by 2010.”*



# IEA/CSLF/GCCSI CRITERIA



1. Scale is large enough
2. Full integration of CO<sub>2</sub> capture, transport and storage
3. Full-scale operation before 2020
4. Location of the storage site is clearly identified
5. A monitoring, measurement and verification plan provided
6. Appropriate strategies for engaging the public
7. Major milestones and adequate funding in place to advance to operation

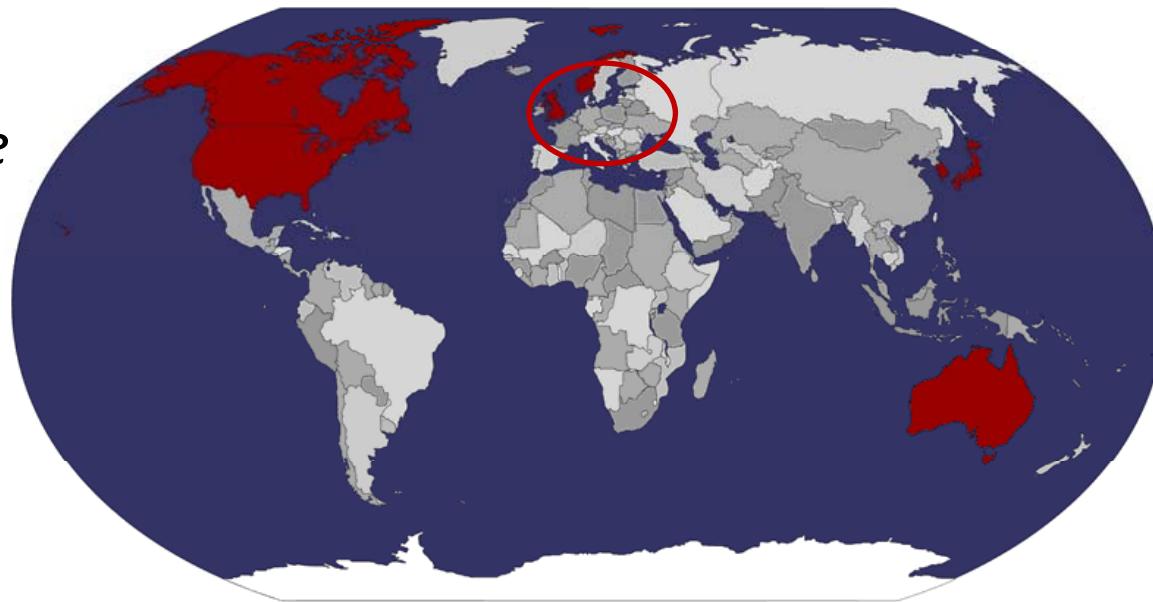


# GOVERNMENT COMMITMENTS

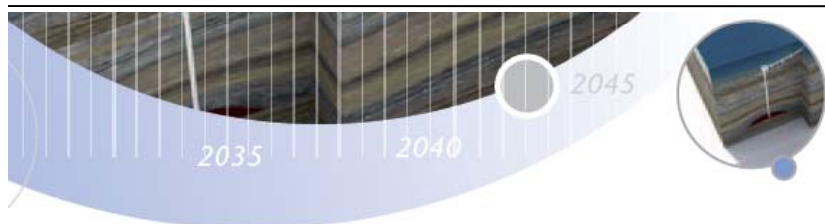


- Over USD 26 billion for demonstration projects
- facilitate the launch of between 19 and 43 projects by 2020

*Countries  
funding large  
scale CCS  
demos*



plus the  
European  
Commission

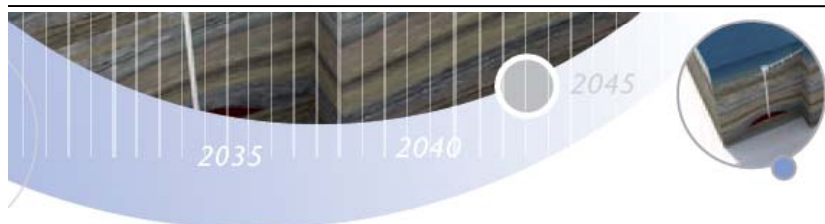
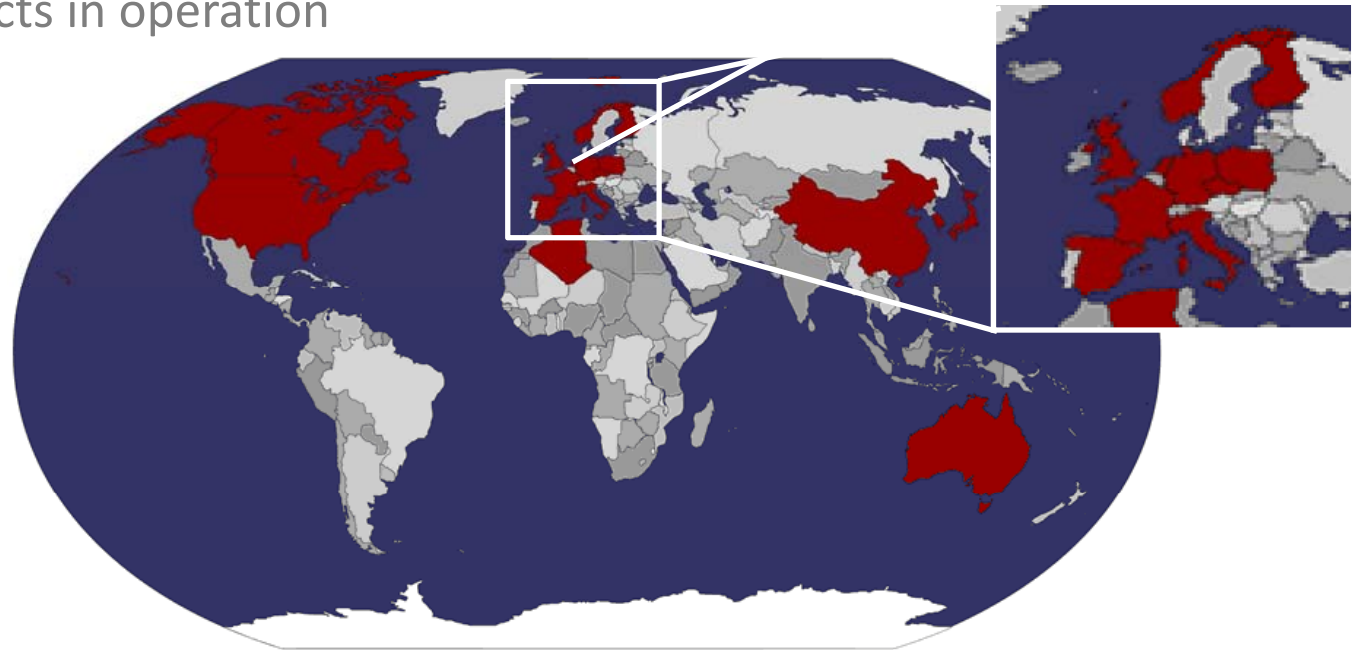


# INDUSTRY DEVELOPMENTS



- 80 large-scale integrated projects at various stages of development including:
  - 5 CCS projects in operation

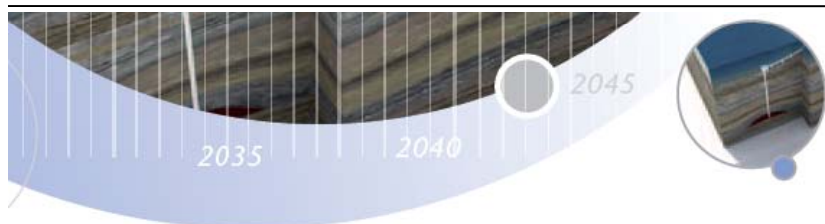
*Countries with  
large scale CCS  
projects  
under  
development*



# INDUSTRY DEVELOPMENTS (2)



- 2/3 of projects in power generation
- 1/3 of projects in industry including:
  - Natural gas separation
  - Cement
  - Aluminium
  - Iron & Steel
- 40% of projects store in conjunction with enhanced hydrocarbon recovery



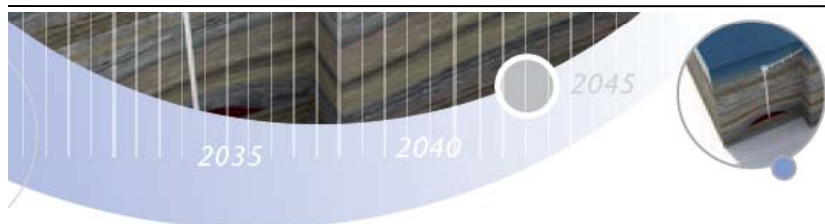


# PROGRESS TOWARDS G8 GOALS

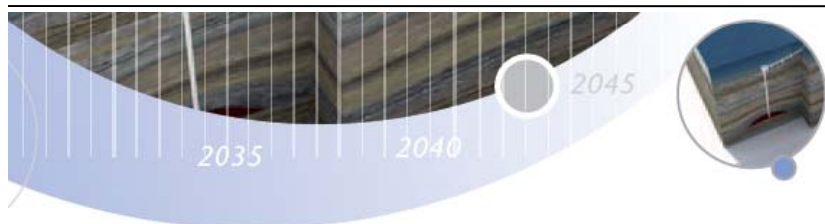
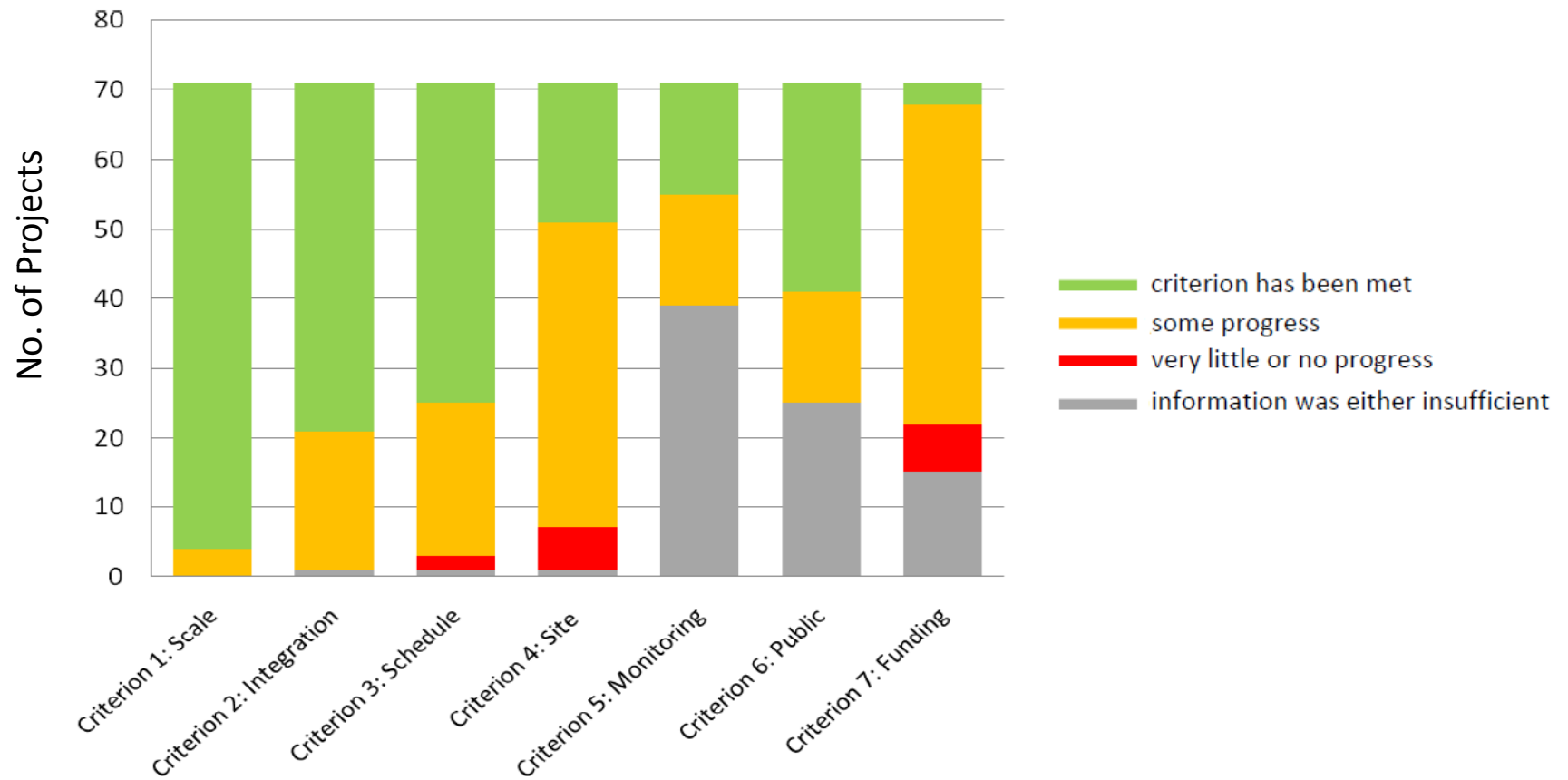


- Achieved by April 2010:
  - 1 new project launched and proceeding to construction - the Australian Gorgon project
  - 7 projects meeting 6 or more criteria
  - 19 meeting 5 or more
  - 36 meeting 4 or more

*The G8 commitment to “beginning broad deployment of CCS by 2020” is achievable but it will be challenging*



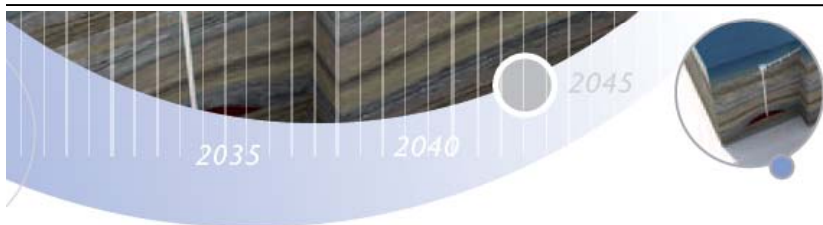
# CHALLENGES REMAIN



# PROGRESS ON OTHER RECOMMENDATIONS (1)



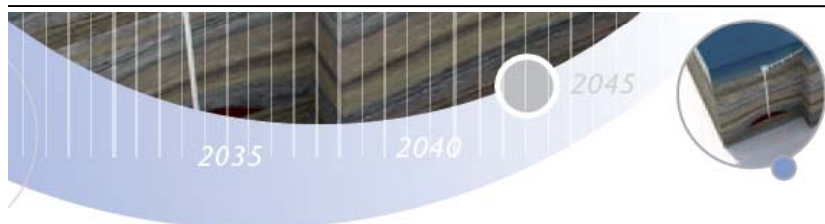
- International collaboration is improving
- Commercial gap for CCS remains
  - Governments making efforts to bridge the gap
- Current value for CO<sub>2</sub> insufficient for CCS
  - No mechanism to incentivize CCS in developing countries



# PROGRESS ON OTHER RECOMMENDATIONS (2)



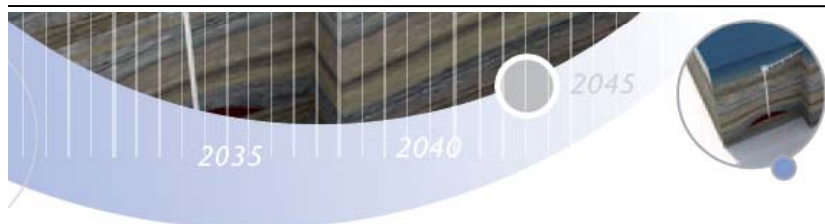
- Significant progress on legal and regulatory frameworks
- A level of experience building around public communication on CCS
- Work on mapping suitable storage sites is proceeding
- A high-level CCS Ready guide and definition has been developed



# NEXT STEPS (1)



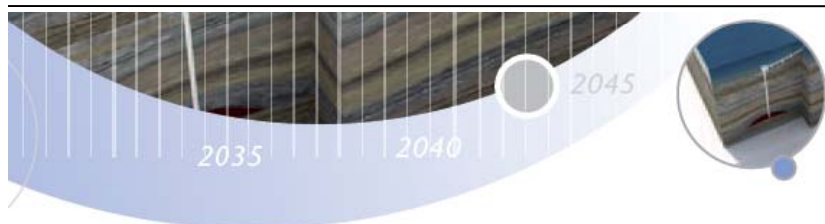
- Greater effort is required to meet the G8 goal of broader CCS deployment by 2020
  - Across sectors and in developed and developing countries
- Continue efforts to have CCS recognized fully in UNFCCC incentive mechanisms
- Governments and industry to promote knowledge sharing on CCS demo projects



# NEXT STEPS (2)

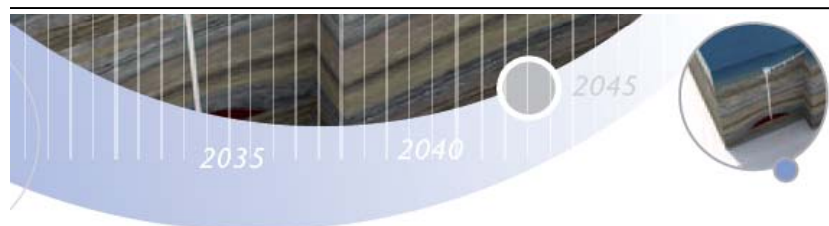


- Private and public financial commitments to increase, particularly in developing countries.
- Governments must develop and finalize legal and regulatory frameworks in key CCS regions
- Governments and industry must significantly increase efforts to characterize suitable geology for CO<sub>2</sub> storage

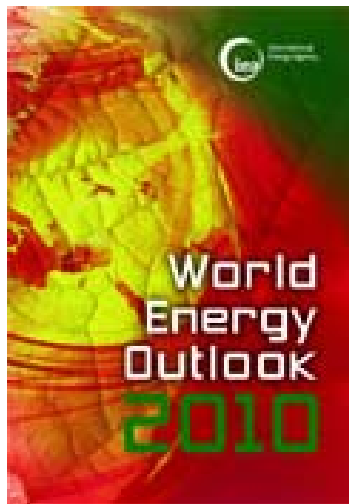


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**Today, as we speak, there are  
1 400 000 000 people in the  
world who don't have access  
to electricity.**



# WEO 2010: launch 9 November



World Energy Outlook 2010

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**PART A  
GLOBAL  
ENERGY TRENDS**

**PART B  
OUTLOOK  
FOR RENEWABLE  
ENERGY**

**PART C  
ACHIEVING  
THE 450 SCENARIO  
AFTER COPENHAGEN**

**PART D  
OUTLOOK FOR  
CASPIAN ENERGY**

**PART E  
FOCUS ON  
ENERGY SUBSIDIES**

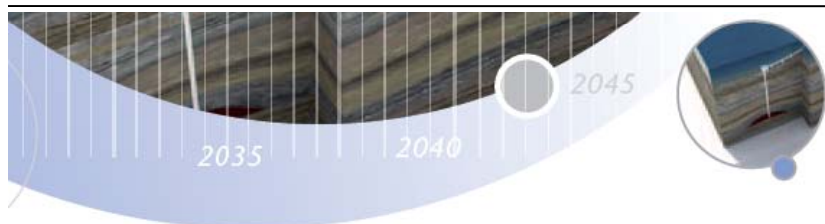
**ANNEXES**

International Energy Agency  
UNDP  
UNITED NATIONS DEVELOPMENT PROGRAMME  
UNIDO  
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

**ENERGY POVERTY**  
*How to make modern energy access universal?*

*Special early excerpt of the World Energy Outlook 2010 for the UN General Assembly on the Millennium Development Goals*

© OECD/IEA, UNDP, UNIDO, September 2010





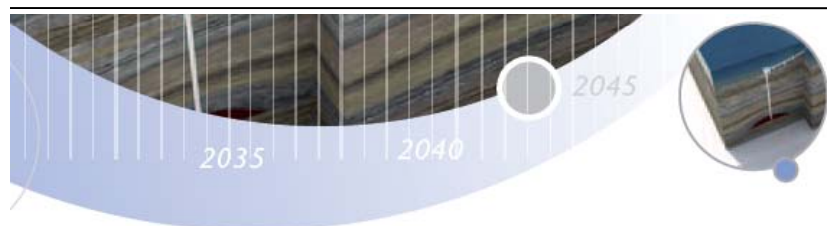


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Thank you!

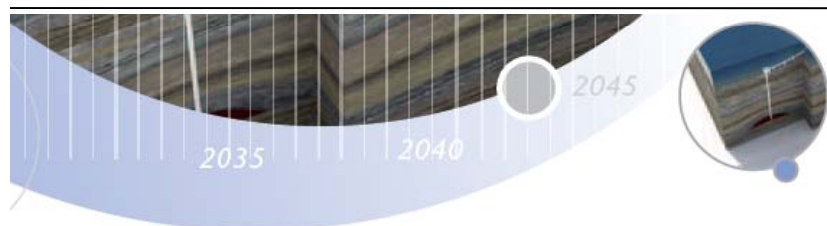
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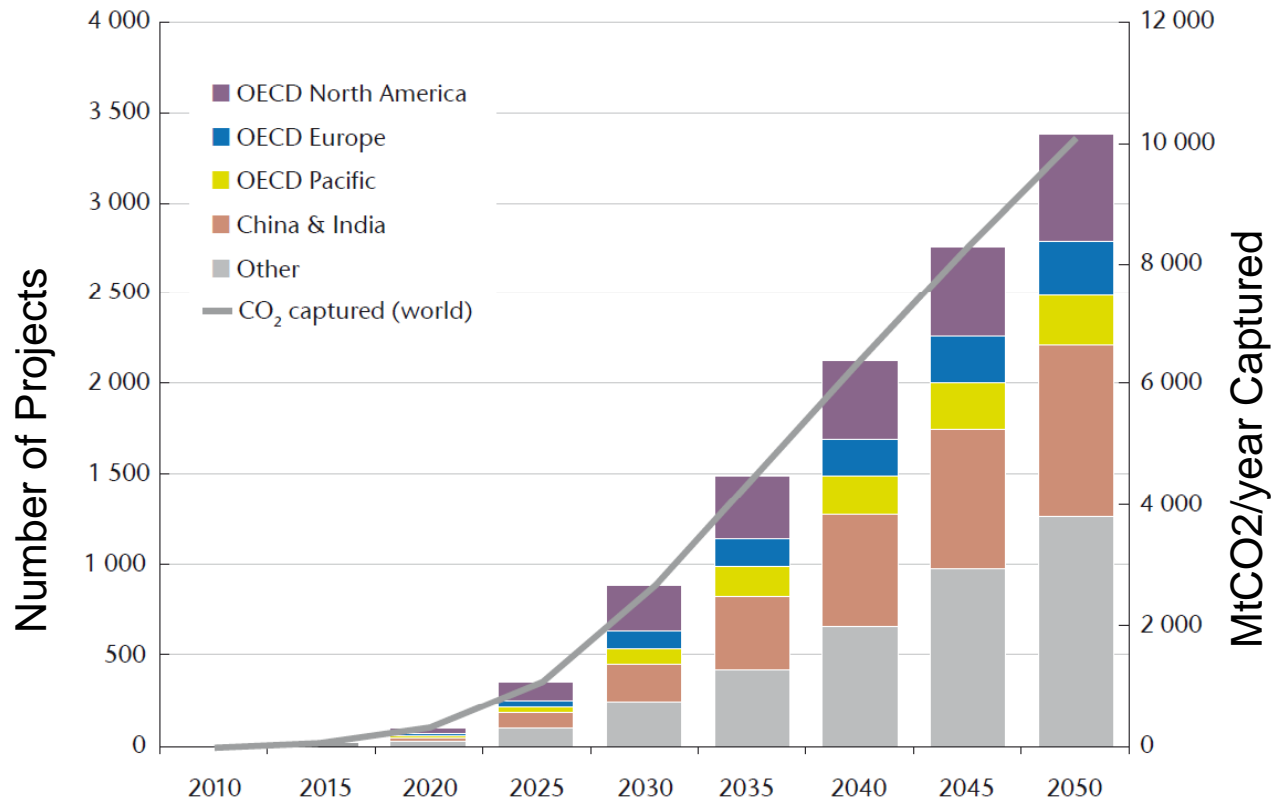


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# Back-up slides

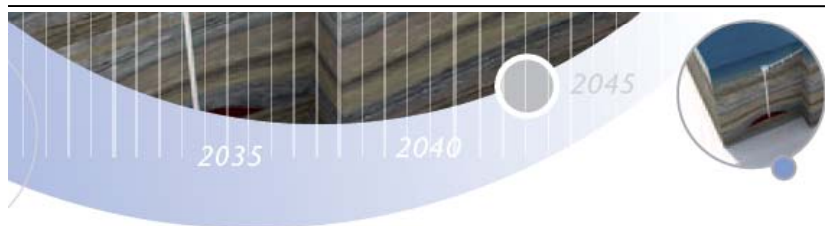


# CHALLENGING DEPLOYMENT

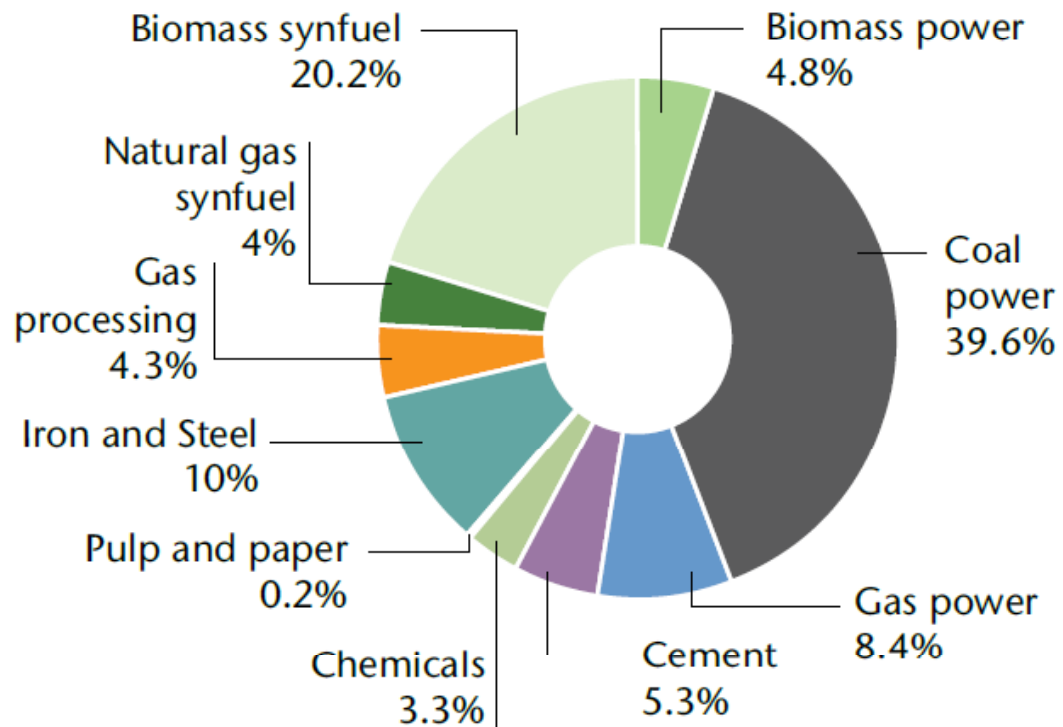


**Ambitious growth path 2010-2050:**

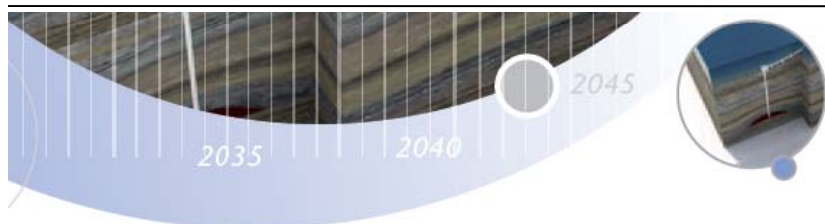
- 3400 projects
- 145 Gt stored



# CCS is NOT just about “clean coal”



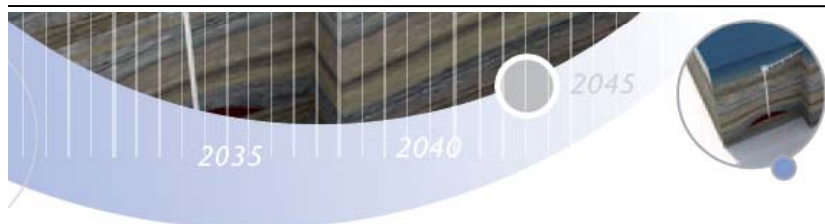
Coal power only makes up around 40% of stored emissions in 2050



# IEA CCS TEAM - composition



- **Juho Lipponen:** Head of Unit
- **Wolf Heidug:** CCS strategy and policy, industrial CCS, biomass & CCS, economic incentives
- **Tsukasa Yoshimura:** storage technology, outreach, public acceptance
- **Matthias Finkenrath:** capture technology, costs and policy
- **Ellina Levina:** Policy & regulation: climate, transport; public acceptance
- **Brendan Beck:** Policy & regulation: capture, storage; outreach
- **Justine Garrett:** legal issues (until June 2011)
- **Dennis Best:** outreach, relations w. partner countries (DALSA team)
- **Jane Berrington:** team assistant



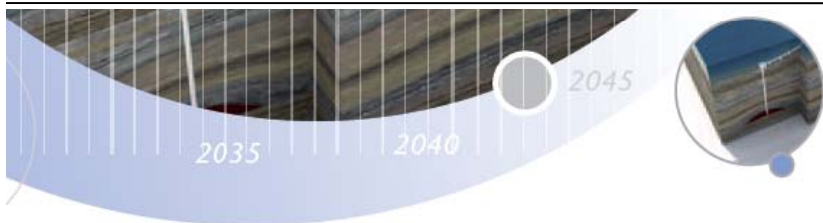
# IEA CCS TEAM – composition (2)

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## OTHER CONTRIBUTING PERSONS:

- **Julian Smith:** statistics (ESD)
- **Keith Burnard:** clean coal, WP FF, las (ETP)
- **Dennis Volk:** power markets (EDD)

Emails: [firstname.lastname@iea.org](mailto:firstname.lastname@iea.org)

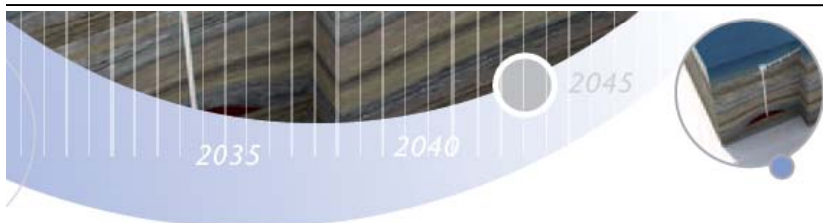


# CCS @ IEA: WP CORNERSTONES



## CCS Strategy & Policy

- CCS Roadmap follow-up
- Incentive mechanisms for CCS and post-2012 frameworks
- Country-specific analysis & profiles
- Specific policy issues: e.g. biomass, industrial CCS, public awareness and engagement etc.

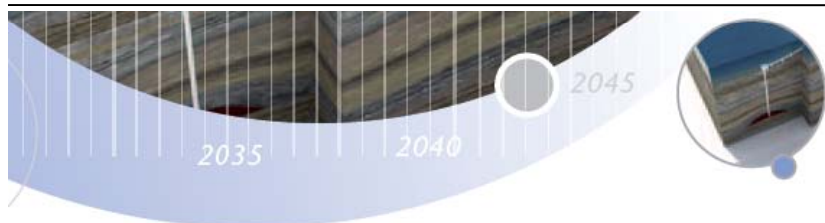


# CCS @ IEA: WP CORNERSTONES



## Legal & Regulatory

- Ongoing analysis of evolving L&R frameworks
- IEA Model Regulatory Framework for CCS
- 6-monthly "Regulatory Review"
- IEA CCS Regulatory Network
- Specific issues: MRV for EOR, safety and LT liability, public engagement processes etc.



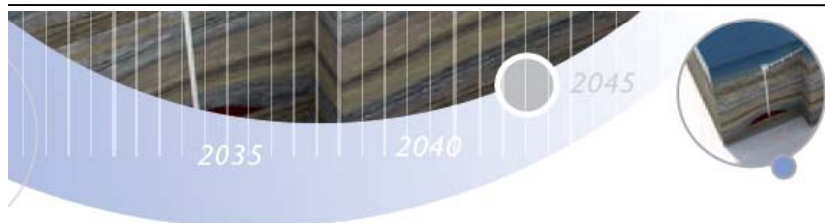


# CCS @ IEA: WP CORNERSTONES



## Technical & Economic

- Costs and economics of CCS: follow-up and data gathering
- Cross-technology analysis: CCS & RES etc
- Global potential of CCS retrofitting
- Storage capacity assessment: status and methodologies

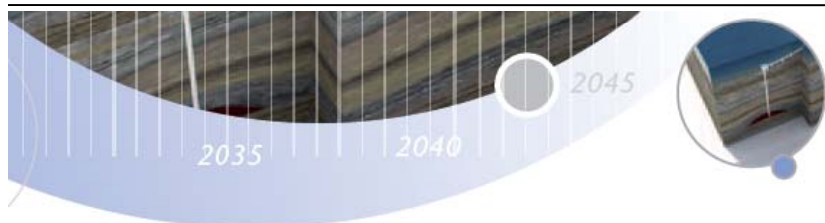


# CCS @ IEA: WP CORNERSTONES



## Capacity-Building & Outreach

- Model regulatory framework roll-out
- Country-specific analysis and (e.g. China: coal plant audits, financing models, early opportunities, knowledge sharing; Indonesia, Mexico, Brazil etc)
- Non-OECD country roundtables and forum
- Stakeholder dialogue: NGOs, equipment manufacturers, industry etc.

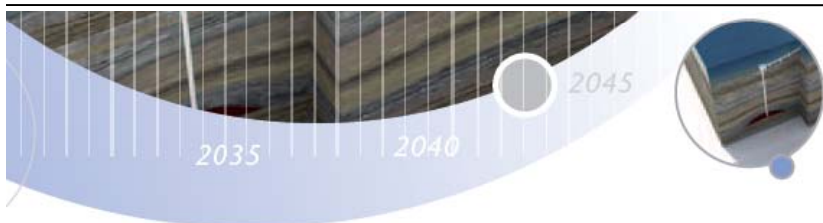


# CCS @ IEA: WP CORNERSTONES



## Stakeholder relations & fora

- **Internal:** WP Fossil Fuels, CERT, Implementing Agreements, Low-Carbon Energy Technology Platform, OECD
- **External:** CSLF, EC, Major Economies Forum / Clean Energy Ministerial, G8/G20 etc.
- **IEA CCS Annual Event**

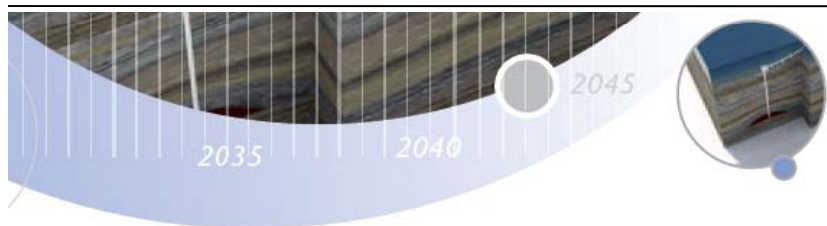


# CCS @ IEA: WP CORNERSTONES



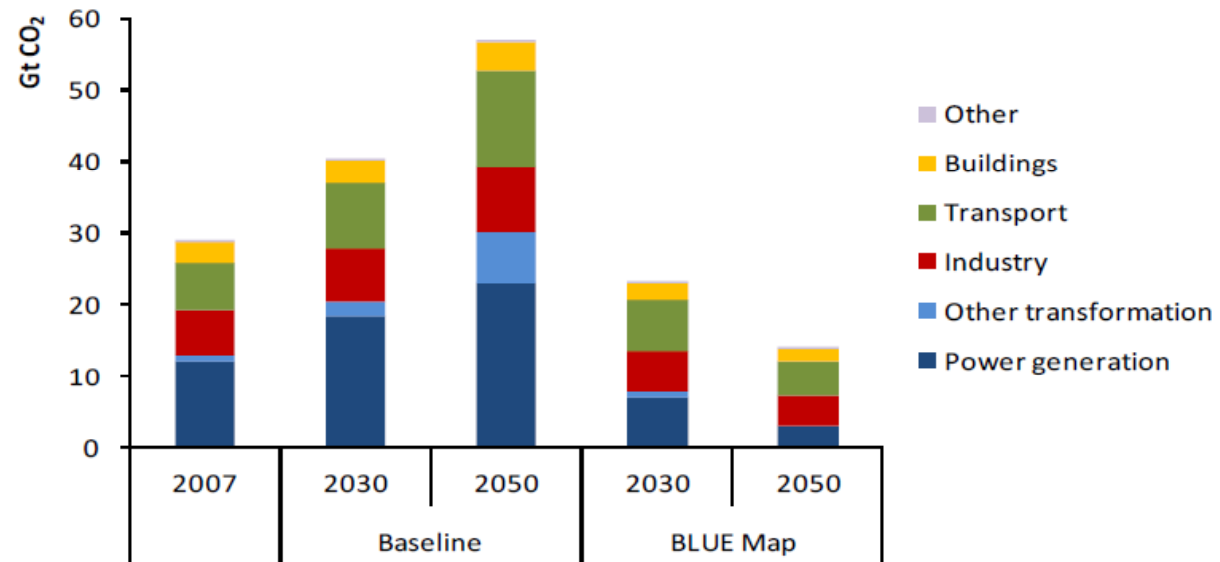
## Communication Strategy

- All activities underpinned by comprehensive communications strategy (internal and external relations, publications, press, website etc etc)





## Energy Technology Perspectives 2010: Summary

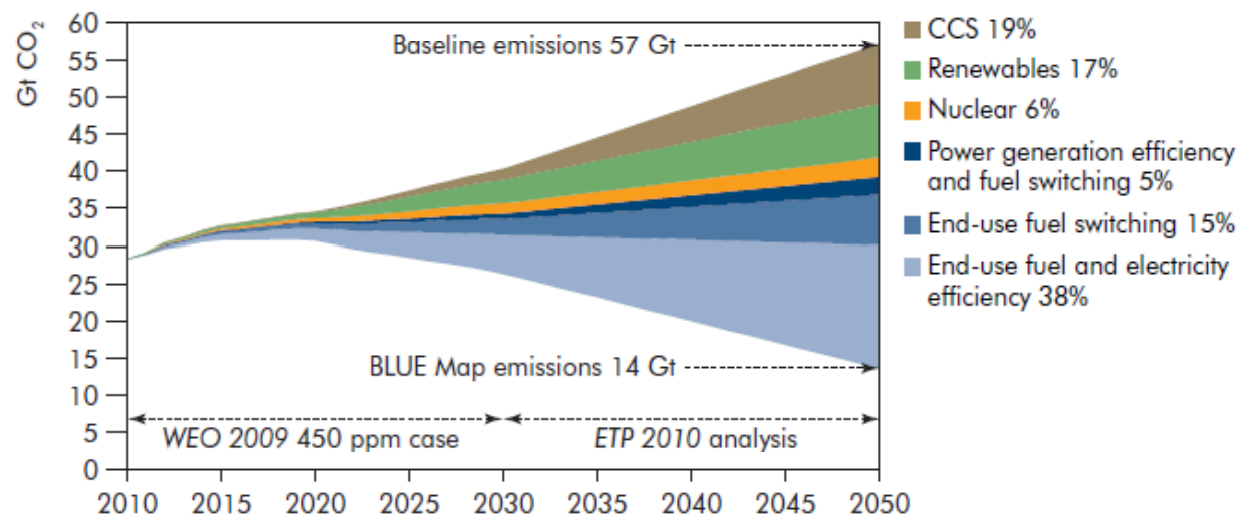


- 29 GtCO<sub>2</sub> in 2007
- Double to 57 GtCO<sub>2</sub> in the Baseline scenario in 2050
- Halved to 14 GtCO<sub>2</sub> in the BLUE Map scenario in 2050
- A wide range of low-carbon technologies contribute to the BLUE Map scenario CO<sub>2</sub> emissions reductions



# CCS in ETP-2010: Contribution to Emissions Savings

- CCS has the 2<sup>nd</sup> largest share (19%) of CO<sub>2</sub> reductions in 2050 (9.4 GtCO<sub>2</sub>, or 120 GtCO<sub>2</sub> from 2010-2050)



- CCS contributes to 31% of emissions reductions in the power sector by 2050, comparable to renewables
- In 2050, 90% of electricity generated from coal comes from plants with CCS (plus 30% of NG plants use CCS)
- In industry & fuel transformation, CCS has the 2<sup>nd</sup> largest share (33%) of direct emissions reductions



# Timeline of IEA/G8 CCS activities

- ▶ Energy Security
- ▶ Environmental Protection
- ▶ Economic Growth
- ▶ Engagement Worldwide

