



Session 5.
Emerging Findings from
Research that may Impact
Regulation of Storage

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IEA Regulatory Network Meeting

27-28 May 2014

IEA Paris

IEAGHG



- An IEA Implementing Agreement founded in 1991 to provide a collaborative international research programme
- Flagship activities:
- **Technical Studies** >250 reports published on all aspects of CCS
- **International Research Networks** -
 - Risk Assessment
 - Monitoring
 - Modelling
 - Environmental Impacts
 - Social Science Research
 - Solid Looping
 - *Oxy-combustion*
 - *Post-combustion Capture*
 - *Wellbore Integrity (PTRC)*
- **GHGT conferences**
- GHGT-12 Austin, Texas
- 5-9 Oct 2014



GHGT-12

IEAGHG Research Networks



- Bring together international key groups of experts to share latest knowledge and experience
- Produce conclusions, recommendations, identify and address knowledge gaps – report of each meeting published
- Depend on experts' time and inputs – valuable and appreciated
- Benefit experts and wider stakeholders - act as informed bodies, eg for US EPA VEF
- Networks on CO₂ geological storage started in 2004/5
 - *Risk Assessment/Management Network*
 - *Monitoring Network*
 - *Wellbore Integrity Network (now PTRC)*
 - *Modelling Network (2009)*
 - *Environmental Research Network (2012)*

10 years of IEAGHG Storage Research Networks



The grid displays 42 report covers from the IEAGHG Storage Research Networks, organized into four rows:

- Row 1 (2002-2007):**
 - MONITORING WORKSHOP NATURAL MEETING (Report: 2002/01)
 - WELLBORE INTEGRITY WORKSHOP (Report: 2002/02)
 - INTERNATIONAL Oxy-Combustion Research Network for CO₂ Capture (Report: 2002/03)
 - Launch Meet the Risk Ass Network (Report: 2002/04)
 - 2nd Meeting of Monitoring Net (Report: 2002/05)
 - International Net for CO₂ Capture Report on 2nd Mt (Report: 2002/06)
 - 2nd Wellbore Integrity Workshop (Report: 2002/07)
 - 3rd MONITORING NETWORK MEETING (Report: 2002/08)
 - INTERNATIONAL NETWORK FOR CO₂ CAPTURE REPORT ON 1st WORKSHOP (Report: 2002/09)
- Row 2 (2003-2007):**
 - 2nd MEET RISK ASSESS NETWORK (Report: 2003/01)
 - 2nd MEETING OF OXY-FUEL NET (Report: 2003/02)
 - 3rd RISK ASSESSMENT NETWORK MEETING (Report: 2003/03)
 - 3rd MEETING OF THE OXY-COMBUSTION NETWORK (Report: 2003/04)
 - INTERNATIONAL NETWORK FOR CO₂ CAPTURE REPORT ON 1st WORKSHOP (Report: 2003/05)
 - 4th WELLBORE INTEGRITY WORKSHOP (Report: 2003/06)
 - 1st JOINT NETWORK MEETING (Report: 2003/07)
 - 4th MONITORING NETWORK WORKSHOP 2nd-4th NOVEMBER 2007 (Edmonton, Canada) (Report: 2003/08)
 - 5th WELLBORE INTEGRITY WORKSHOP (Report: 2003/09)
 - 4th RISK ASSESSMENT WORKSHOP (Report: 2003/10)
- Row 3 (2008-2011):**
 - 5th MONITORING WORKSHOP (Report: 2008/01)
 - INTERNATIONAL NETWORK FOR CO₂ CAPTURE REPORT ON 12th MEETING (Report: 2010/03, January 2010)
 - 2nd CO₂ GEOLOGICAL STORAGE MODELLING NETWORK MEETING (Report: 2010/06, April 2010)
 - 2nd HIGH TEMPERATURE SOLID LOOPING NETWORK MEETING (Report: 2010/09, November 2010)
 - 1st SOCIAL RESEARCH NETWORK MEETING (Report: 2010/09, June 2010)
 - WELLBORE INTEGRITY NETWORK MEETING (Report: 2010/10, July 2010)
 - SUMMARY REPORT OF THE 5th RISK ASSESSMENT NETWORK MEETING (Report: 2010/12, May 2010)
 - 6th IEAGHG MONITORING NETWORK MEETING (Report: 2010/14, July 2010)
 - NATURAL REL CO₂: BUILDING KNOWLEDGE STORAGE ENVIRONMENTAL IMPACT ASSES (Report: 2011/03, June 2011)
 - SUMMARY REPORT OF THE 2nd IEAGHG SOCIAL RESEARCH NETWORK MEETING (Report: 2011/12, November 2011)
 - 3rd HIGH TEMPERATURE SOLID LOOPING NETWORK MEETING (Report: 2011/15, December 2011)
- Row 4 (2010-2011):**
 - 1st IEAGHG MONITORING NETWORK MEETING (Report: 2010/01)
 - 2nd IEAGHG MONITORING NETWORK MEETING (Report: 2010/02)
 - 3rd IEAGHG MONITORING NETWORK MEETING (Report: 2010/03)
 - 4th IEAGHG MONITORING NETWORK MEETING (Report: 2010/04)
 - 5th IEAGHG MONITORING NETWORK MEETING (Report: 2010/05)
 - 6th IEAGHG MONITORING NETWORK MEETING (Report: 2010/06)
 - 7th IEAGHG MONITORING NETWORK MEETING (Report: 2010/07)
 - 8th IEAGHG MONITORING NETWORK MEETING (Report: 2010/08)
 - 9th IEAGHG MONITORING NETWORK MEETING (Report: 2010/09)
 - 10th IEAGHG MONITORING NETWORK MEETING (Report: 2010/10)
 - 11th IEAGHG MONITORING NETWORK MEETING (Report: 2010/11)
 - 12th IEAGHG MONITORING NETWORK MEETING (Report: 2010/12)

UNFCCC - CCS in CDM



- Discussions/negotiations started in 2005 – lack of progress
- **CMP7/COP16, 2010, Cancun**
 - **CCS is eligible provided that certain issues can be addressed**
 - Issues include site selection, modelling, monitoring, risk assessment, liabilities (short and long-term)
 - Work programme for 2011:
 - Submissions and ‘Synthesis report’
 - **Technical workshop (technical and legal expertise)**
 - UNFCCC to draft Modalities and Procedures for SBSTA 35 (Durban Dec 2011)
- **IEAGHG: used Research Networks to address Cancun issues**

UNFCCC Technical Workshop



Abu Dhabi 7-8 Sep 2011

- Brought technical expertise to negotiators
- Technical experts on site selection; modelling; accounting; project boundaries; transboundary; risk assessment; environmental impacts; monitoring; liability (28 talks, several members of IEAGHG Networks).
- Results and experiences from real projects and natural systems, to support modelling and risk assessments
- Good Q&As from CCS negotiators and others



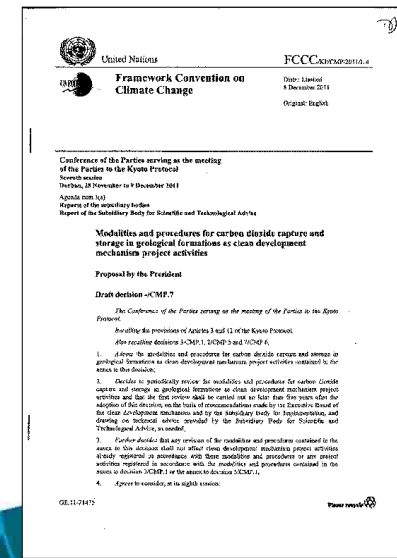
CMP7/COP17 Durban (2011) Negotiations on CCS CDM



- Over 32 hours of formal negotiations



- Agreed and adopted CCS Modalities and Procedures (Decision 10 CMP.7)



Next meeting



- **Monitoring Network and Modelling Network combined meeting**
- 5-7 August, WVU, Morgantown, USA

covering:

- *Modelling:*
 - Long-term predictability
 - Heterogeneity and up-scaling capacity models
 - Leakage pathways and fault transmissivity
 - CO₂-EOR
- *Monitoring:*
 - Detection of leakage
 - Quantification of leakage
 - Offshore
 - Cost-effectiveness
 - Assurance
- Overburden
- Microseismicity
- Modelling to improve monitoring efficiency
- External perspectives
- Communicating to regulators

Session 5



- Soil gas monitoring – Katherine Romanak, UT
- Offshore monitoring – Doug Connelly, NOC
- Storage site closure (CO2CARE) – Jens Wollenweber, TNO
- Reducing risk through modelling – Grant Bromhal, NETL