EC support to Carbon Capture and Storage

Research Perspective

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CO2 Capture and Storage - Regional Awareness-Raising Workshop
13-14 June 2012, Ankara, TURKEY
SET-Plan – the technology pillar of EU energy and climate change policy

Objective:
- To accelerate the development of a portfolio of low carbon technologies leading to their market take-off
- To achieve targets of the Europe 2020, while at the same time investing in RD&D for the 2050 horizon

Main elements:
- Joint strategic RD&D planning between EU Member States, Industry, Research Community and the EC
- Increase in resources- financial & human
- Reinforced international cooperation
Implementation of the SET-Plan

Through:

- European Industrial Initiatives (EIIIs)
- European Energy Research Alliance (EERA)
- Trans-European Energy Networks and Systems of the Future

Information and Monitoring system (SETIS)
European Industrial Initiative on Carbon Capture and Storage (EII on CCS)

A 10-year programme (launched July 2010) of private/public actions in a dual-track approach:

**Demonstration of CCS at full-scale...**

- through a set of power plants (~250 MW) with different capture, transport and storage options...
- with a relevant geographical spread,
- to prepare the way for fully commercial implementation;

A comprehensive **R&D programme to support demonstration and**

- develop more efficient and cost-competitive capture technologies,
- extend the application of CCS to other carbon intensive industries
EII on CCS – Technology Roadmap 2010-2020

- **Proving existing CCS technologies**
  - 2010: Construction of CCS demo plants
  - 2012: Establishment and operation of a network of CCS projects (knowledge sharing, joint activities)

- **Developing more efficient and cost-competitive CCS technologies**
  - 2015: R&D on power plant efficiency
  - 2017: R&D and pilots on capture technologies
  - 2020: R&D and pilots for CCS in industrial applications

- **Operation of the full CCS chain (capture/transport/storage) at large scale**
  - 2015: Operation of up to 12 CCS demonstration plants

- **Demonstration of CCS chains using existing technologies**
  - 2020: Demonstration of CCS chains using existing technologies
EC support to CCS demonstration

Funding demonstration:

- **Economic Recovery programme (EEPR)** - 6 CCS projects (1.0 bn €): ROAD, NL; Don Valley, Compostilla, ES; Porto Tolle, IT; Bełchatów, PL; Jänschwalde, DE (later closed due to lack of acceptance)

- **New Entrance Reserve 300 (NER300)** with industry/MS resources - award decision - end 2012 (~2 bn € available in the 1st call based on the price of the allowances)

Public engagement: CCS Project Network, FP7 projects, Zero Emission Platform (ZEP)

Knowledge sharing: CCS Project Network, ZEP

Legal: Transposition of the Directive and permitting storage in MS

Storage capacity and infrastructure: European storage atlas

R&D Funding: CCS research and pilot-scale projects (capture and storage) through FP7
**CCS Demonstration Project Network**

**Overview**
- **Provide first movers with a means of coordination, exchange of information and experience and identification of best practices**
- **Current members**: EEPR projects + Technical Center Mongstad

**Objectives**
- **Knowledge sharing**
- **Public engagement**: consistent, collective and coordinated communication will have a higher impact

**Co-operation with 3rd parties**
- **Global CCS knowledge sharing to accelerate commercial deployment** – GCCSI & US Southeast Regional Carbon Sequestration Partnership (SECARB)
- **Coordinate EU CCS demonstration**
International Cooperation

Membership of international level:
- Carbon Sequestration Leadership Forum (CSLF)
- International Energy Agency (IEA)
- Global CCS Institute (GCCSI)

Established bilateral S&T cooperation:
- USA – EU-US Energy Council Working Groups
- Japan – expert workshops, site visits planned
- Canada – visit in May 2010
- China – NZEC project, multiple participation in FP6 & FP7 projects
- India – OPTIMASH project on Clean Coal Technologies, strong Turkish partnership
- South Africa – fact finding visit in 2009, target opening in FP7-ENERGY-2013 call
- Australia – visit in Dec. 2011, target opening in FP7-ENERGY-2013 call
FP7 support of CCS research and development (1)

FP7 : 2.3 b€ for Energy

About 160 M€ spent or earmarked for CCS and Clean Coal

Nearly 75 M€ should be still available for CCS and Clean Coal in FP7
FP7 support of CCS research and development (2)

Supported research in the field of

• CCS technology development: capture, storage and transport of CO2

• Clean Coal technology development: gas turbines for IGCC plants, efficiency increase, feasibility study for CCS demo plant

• Non-technological research: in support of regulatory activities, public awareness, trans-national cooperation

• Other greenhouse emissions
FP7: Support to CCS in 2012

FP7 ENERGY-2012-1 call, area 5 and area 5&6
EC funding: up to 21.5 M€;

Proposals in 2 topics were evaluated by 25 May 2012:
- **Sizeable pilot tests for CO2 geological storage** (max EC contribution 9M€/project)

- **Impact of the quality of CO2 on transport and storage behaviour** (Common interest of EU & Canada)

There was good response to the call. Three proposal in total will be invited for negotiations in the above topics.
FP7: Support to CCS in 2012 (2)

FP7 ENERGY-2012-2 call, area 5&6
EC funding: up to 22 M€
Evaluated: May 2012
Evaluation completed, ranking to be approved by the Programme Committee

- Pilot plant-scale demonstration of post-combustion CO2 capture processes
- Pilot plant-scale demonstration and integration of emerging and new combustion technologies (Chemical looping)
FP7 support to CCS in 2013 continues

FP7 ENERGY -2013-1 call; indicated budget around 28,5M€:

- Scale-up of advanced high-efficiency capture processes (2x8M€)
- New generation high-efficiency capture processes (beyond the current horizon) - twinning with Australia, SME participation
- Mitigation and remediation in case of leakage of CO2 from geological storage – safety protocols, industry participation
- Combined underground coal gasification and CO2 capture & storage (targeted opening to SA, AU, USA, India, China)

These areas are preliminary indications! Minor changes are still possible.

- Info Day - 4 July 2012
- Publication of the call -10 July 2012
- Closure - 29 November 2012 (one stage call)
FP7 Energy 2013 Work Programme

FP7-Energy-2013-1 call – to be open on 10 July 2012

Orientation paper on FP7 ENERGY 2013 Work Programme

Energy Research Information day - 4 July 2012, Brussels, Charlemagne building (web streaming available)
http://ec.europa.eu/research/conferences/2012/energy_infoday/infoday_energy_en.htm
EC support to CCS in HORIZON 2020

EC proposal for HORIZON2020:

➢ Multiannual (2014-2020) research & innovation funding programme for €80 bln, which is part of the next EU budget, complementing Structural Funds, education, etc.

➢ A core part of Europe 2020, Innovation Union & European Research Area

➢ EC proposed an increase of the Energy research funding to €5.8bln (from €2.3bln in FP7)

➢ Continuing support of the SET-plan technologies, including CCS

Looking ahead

- Continuation of public research efforts on CCS, in FP7 and Horizon 2020 as part of the SET plan priorities
- Interaction between research, pilot scale and demo projects needs to be ensured
- Continuation of international cooperation efforts on CCS research
- Knowledge sharing at international level has to be promoted
- Extension to other carbon-intensive industries is needed
- Public awareness and understanding of CCS needs to be addressed at an early stage
Key challenges

Techno-economic challenges
- Cost of CCS – reduction of capture, transport and storage costs
- Large scale demonstration of the value chain - business case for operation of demo projects (e.g. EOR)

Regulatory challenge
- Transposition of CCS Storage Directive – not all MS permit CO2 storage or have storage capacity

Public challenge
- Public engagement, education and understanding – it is of utmost importance for public acceptance of the technology (CGS Europe plays an important role)

Societal challenge
- Rapid deployment of CCS and reduction of CO2 emissions – climate change mitigation potential of CCS is not always clear for the general public
Role of Turkey in CCS RD&D

Achievements:

- Active participation in FP7
  - Strong involvement in CGS Europe (CCS), OPTIMASH (Clean coal technology, cooperation with India) project
  - Evaluation of proposals of FP7-ENERGY calls
- Expertise in Clean Coal technologies and CCS
- Industrial experience in EOR
- Active member of EII CCS team

Further potential of Turkish CCS and Clean Coal community:

- Knowledge sharing with European CCS Demonstration Project Network (EOR, technology acceptance) [http://www.ccsnetwork.eu/](http://www.ccsnetwork.eu/)
- Encouraged participation in FP7-ENERGY-2013 call and in H2020 calls
- Further strengthen international cooperation in research and demonstration
- Closer links with ZEP
SUCCESS !