



# EC support to Carbon Capture and Storage

## Research Perspective

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# **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 (EIIs)***
- ***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:

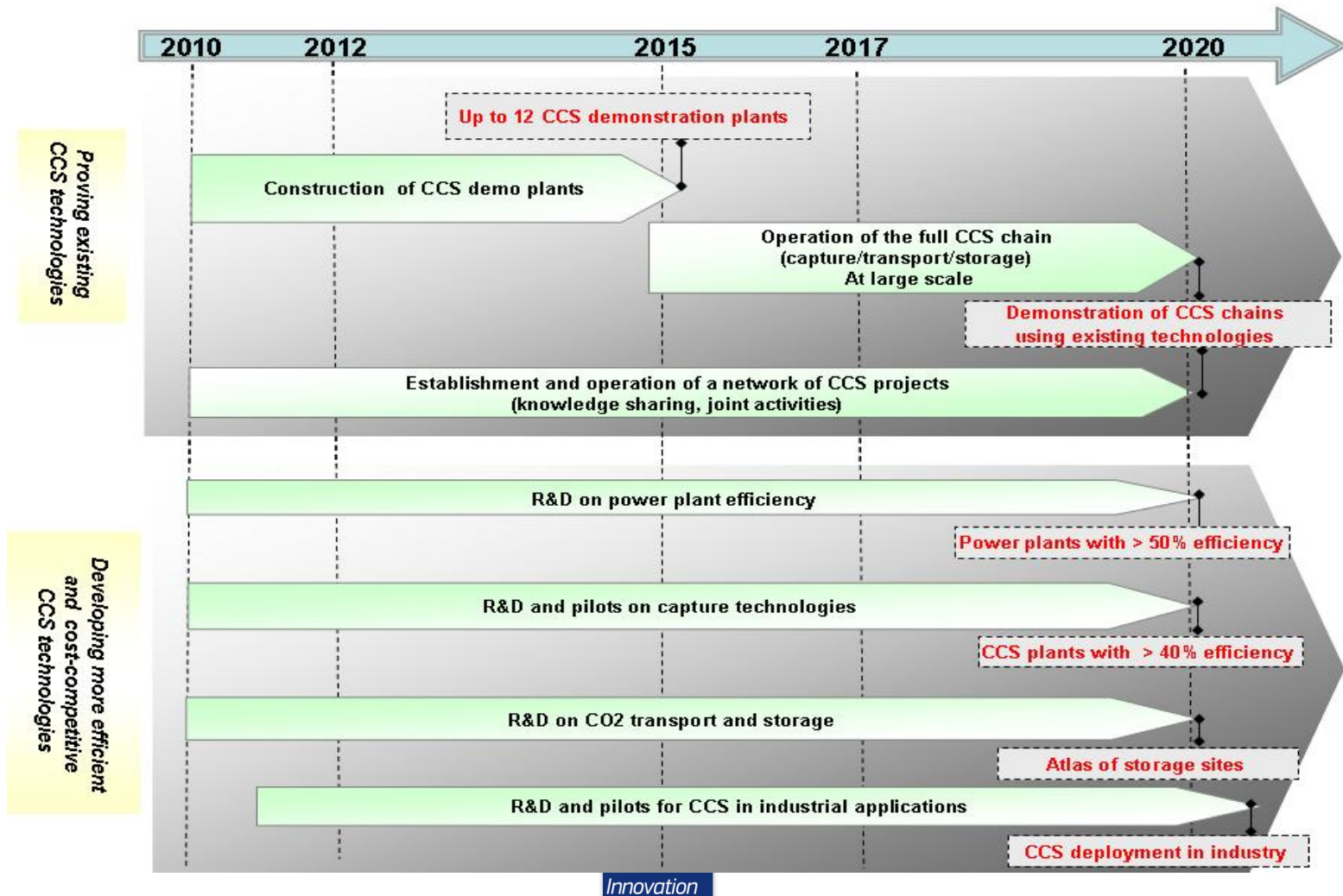
## **Demonstration** of CCS at full-scale...

- *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*

# EI on CCS – Technology Roadmap 2010-2020



## **EC support to CCS demonstration**

### **Funding demonstration:**

- *Economic Recovery programme (EPR) - 6 CCS projects (1.0 bn €): ROAD, NL; Don Valley; Compostilla, ES; Porto Tolle, IT; Bełchatów, PL; Jämschwalde, 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 1<sup>st</sup> 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: EEPB 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 CO<sub>2</sub>**
- **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 CO<sub>2</sub> geological storage** (max EC contribution 9M€/project)
- **Impact of the quality of CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> from geological storage – safety protocols, industry participation**
- **Combined underground coal gasification and CO<sub>2</sub> 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**

[https://ec.europa.eu/research/participants/portal/ShowDoc/Extensions+Repository/General+Documentation/Orientation+papers+2013/Cooperation/fp7-energy-orientation-paper\\_en.pdf](https://ec.europa.eu/research/participants/portal/ShowDoc/Extensions+Repository/General+Documentation/Orientation+papers+2013/Cooperation/fp7-energy-orientation-paper_en.pdf)

**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](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**
- **Current status – scrutiny of European Council and European Parliament; Adoptions second half of 2013.**

## 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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/>**
- **Encouraged participation in FP7-ENERGY-2013 call and in H2020 calls**
- **More CCS and Clean Coal experts should register/update their profile in EU expert database**  
**<https://cordis.europa.eu/emmfp7/index.cfm>**
- **Further strengthen international cooperation in research and demonstration**
- **Closer links with ZEP**



**SUCCESS !**