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EC initiatives on CCS - Research Dimension

**IEA - MOST CCUS Workshop:
Joint Activities and Opportunities, 18-19 September, Beijing**

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DG Research - Directorate for Energy**





EU Strategic Policy Objectives

- **Europe 2020 – smart, sustainable and inclusive growth**
- **EU energy policy targets - sustainability, competitiveness and security of supply**
- **Innovation Union flagship initiative - COM(2010) 546**
 - A strategic and integrated approach to research and innovation
- **Horizon 2020 - a Common Strategic Framework for research and innovation focusing on societal challenges, competitiveness and research excellence**
- **Energy research and innovation**
 - Strategic Energy Technology Plan (SET-plan)
 - Joint programming, Public Private Partnerships (PPPs)



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**

Implementation:

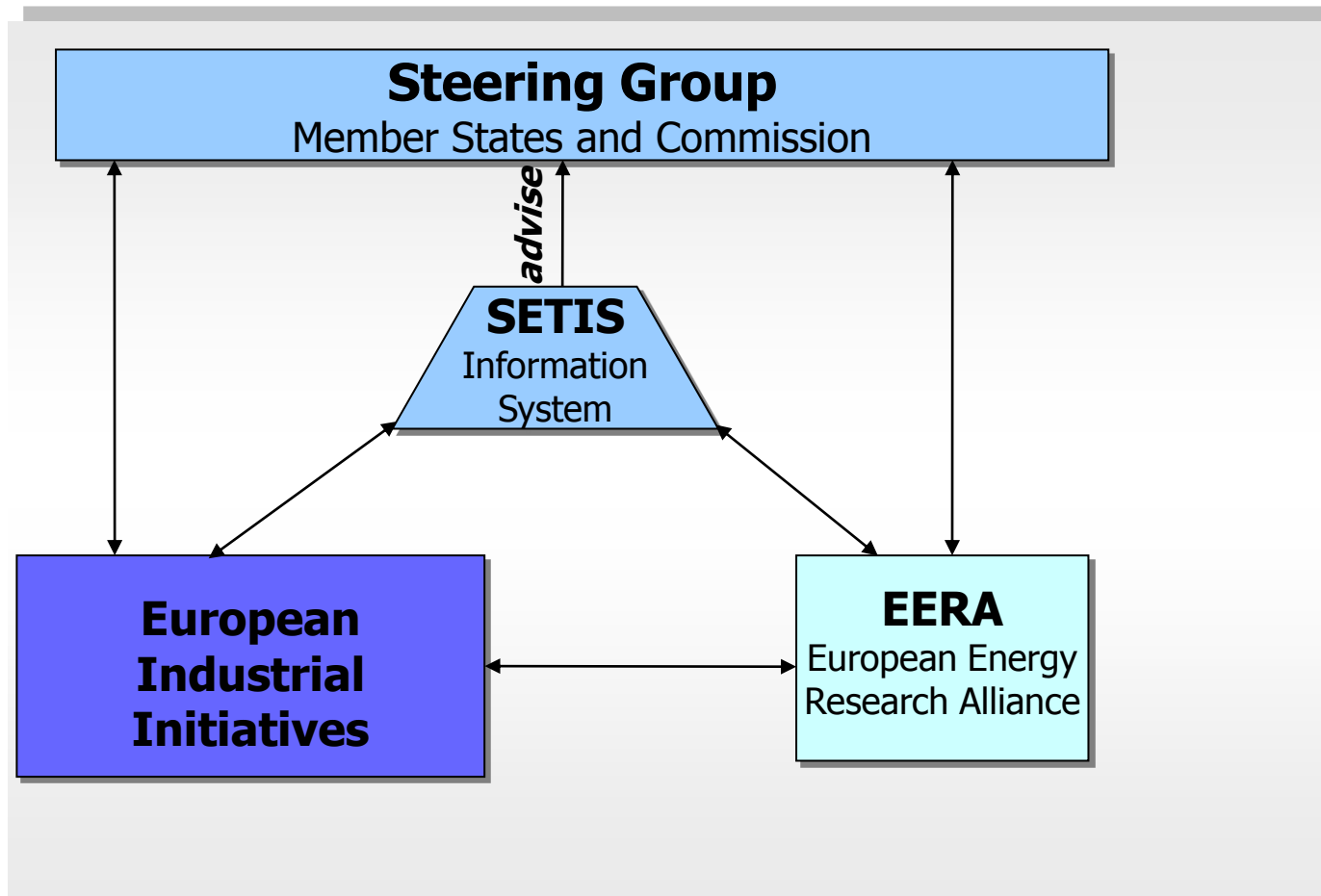
- **European Industrial Initiatives (EII)**
- **European Energy Research Alliance (EERA)**
- **Trans-European Energy Networks and Systems of the Future**



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Simplified SET Plan governance



➤ SET Plan Conference in Poland 28-29 November 2011



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European Industrial Initiatives (EII)

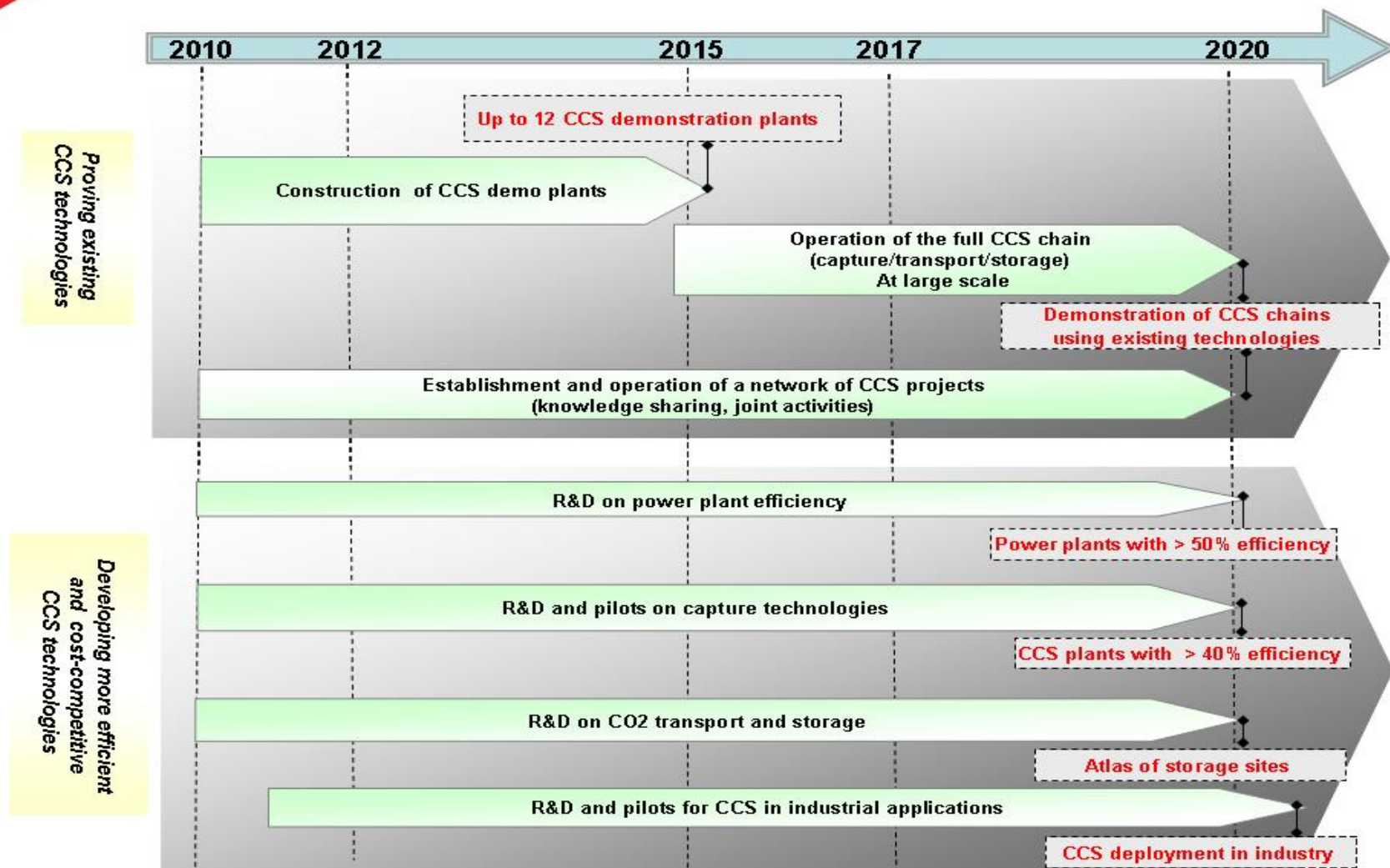
- **Launched**
 - **Wind, Solar, **CCS**, Electricity Grids, Sustainable Nuclear, and Bioenergy (launched in 2010)**
 - **Fuel Cells Hydrogen (on-going since 2008)**
 - **Smart cities and communities (launched 21 June 2011)**
- **All parties committed to support:**
 - **Technology Roadmaps 2010-2020**
 - **Implementation Plans 2010-2012**
 - **Close cooperation, light governance structure**



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EI on CCS – Technology Roadmap 2010-2020





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European Energy Research Alliance (EERA)

Initiative by a number of leading European research institutes (Oct. 2008)

- *more than 1000 researchers from more than 70 research organisations*
- *European University Association (EUA) joined as an observer*

Aim: to accelerate development of new energy technologies through Joint Programmes (JPs):

- ***CCS, Nuclear, Bioenergy, PV, Smart Grids, Wind and Geothermal** launched in 2010*
- *Two new Joint programmes: **Concentrated Solar Power and Marine Energy** to be launched in November 2011 in Warsaw*
- *The **CCS** Joint programme has 32 members, 12 MS, 270 py/year, two sub-programmes: CO₂ Capture and CO₂ storage*

EC initiatives for CCS

- **Demonstration funding:**
 - ***Economic Recovery programme (EEPR)***
6 CCS demo projects supported (1.0 bn €)
 - ***New Entrance Reserve 300 (NER300)*** *with industry/MS resources - award decision in second half 2012 (~4.5 bn €)*
- **Public Engagement:** CCS Project Network, FP7 projects, Zero Emission Platform (ZEP)
- **Knowledge sharing:** CCS Project Network, ZEP
- **Legal:** Transposition of the Directive and permitting in MS is due in 2011
- **Storage capacity and infrastructure:** European storage atlas
- **R&D Funding:** CCS research and pilot-scale projects through FP7



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EEPR Locations



SELECTED PROJECTS
CO₂ CAPTURE AND STORAGE



Don Valley
UK
(ex-Hatfield)
900 MW, IGCC

Rotterdam,
NL
250MW,
post-
combustion

Compostilla, ES
323MW, oxyfuel

Porto Tolle, IT
250MW, post-combustion

Belchatów, PL
250MW,
post-combustion,
lignite

Jämschwalde,
DE
300MW,
post-combustion &
oxyfuel, lignite



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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

- **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
 - Coordinate EU CCS demonstration

Carbon Capture and Storage (CCS) Framework Programmes in support of RTD

EU Framework Programmes

About 86 M€ spent on CCS in FP5 & FP6

FP7 : 2.3 b€ for Energy

✓ **About 140 M€ spent or earmarked for CCS so far**

FP7: Support to CCS in 2012

✓ ***FP7 Call (2012-1) DG RTD: Indicative EC funding: 21.5 M€***

Deadline: 25 October 2011 at 17:00:00 (2-stage call)

✓ ***FP7 Call (2012-2) DG ENER: Indicative EC funding: 22 M€***

Deadline: 08 March 2012 at 17:00:00 (1-stage call)



CCS topics

- Sizeable pilot tests for CO₂ geological storage
- Pilot plant-scale demonstration of post-combustion CO₂ capture processes
- Pilot plant-scale demonstration and integration of emerging and new combustion technologies (Chemical looping)
- Impact of the quality of CO₂ on transport and storage behaviour (Partners from the CSLF in particular the U.S., Canada and China are encouraged)
- Secretariat for the ZEP Technology Platform

Membership of international level:

- Carbon Sequestration Leadership Forum (CSLF)
- International Energy Agency (IEA)
- Global CCS Institute (GCCSI)

Established bilateral S&T cooperation:

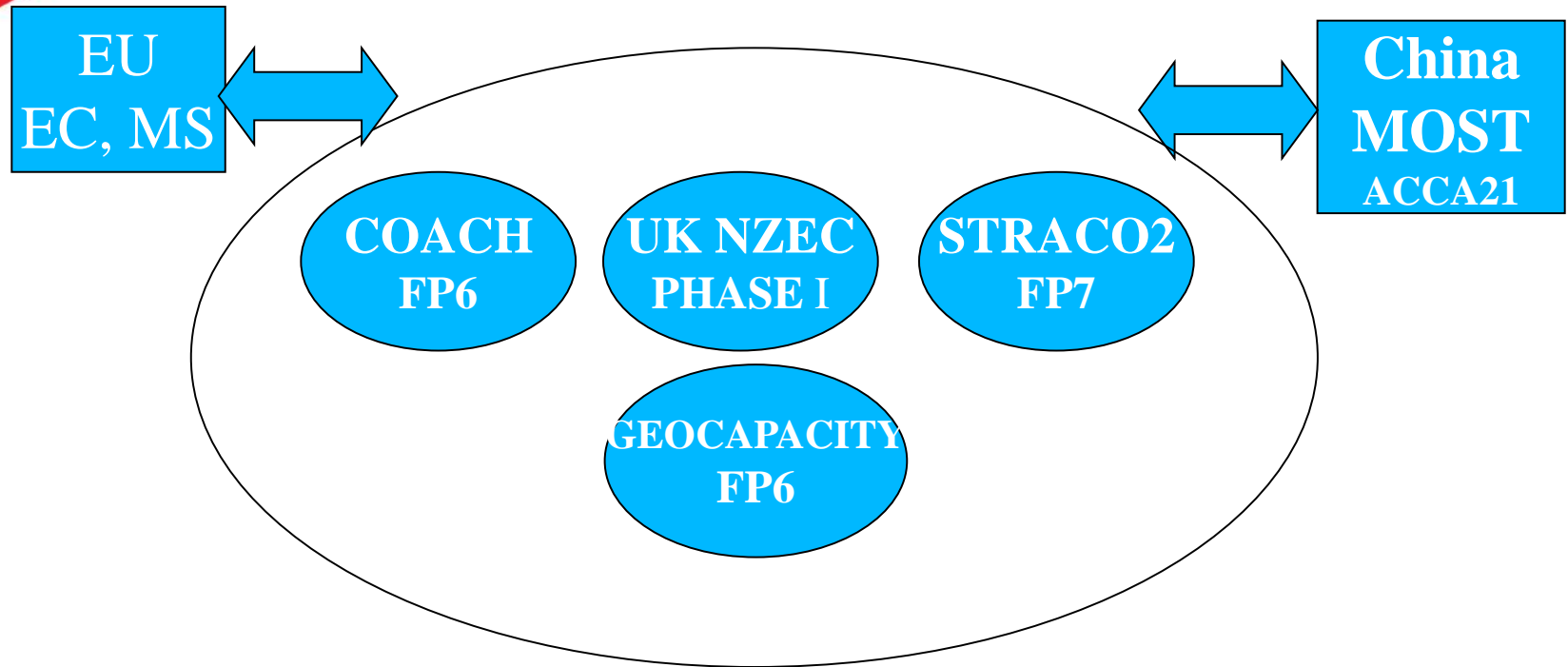
- USA – EU-US Energy Council Working Groups
- Japan – expert workshops and site visits planned
- Canada – visit in May 2010
- China – NZEC project, multiple participation in FP6 & FP7 projects
- India – OPTIMASH project on Clean Coal Technologies
- South Africa – fact finding mission 2009
- Australia – Visit to take place in Dec. 2011



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EU-China NZEC Phase I



- **Phase I: Conclusion in October 2009 in Beijing**
- **Phase II: Signature of a EU-China MoU in Nanjing in 2009**
 - **Phase IIA: pre-feasibility and project identification with support from EC, UK and Norway.**



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EU Projects on CCS with Chinese Participation

Project	Project title	Chinese participants
EUGEOCAPACITY (1.9 M€)	Assessing European Capacity of Geological Storage of CO ₂	Tsinghua University
CACHET (7.5 M€)	Carbon Dioxide Capture and Hydrogen Production from Gaseous Fuels	Dalian Institute of Chemical Physics
COACH (1.5 M€)	Cooperation Action with CCS China MoU	9 including: ACCA21, Greengem, PetroChina
STRACO ₂ (0.86 M€)	Support to Regulatory Activities For Carbon Capture and Storage	3 including: ACCA21
CACHET II (3.89 M€)	Carbon Capture and Hydrogen Production with Membrane	2 including : Dalian Institute of Chemical Physics
iCap* (4.25 M€)	Innovative CO ₂ capture	Tsinghua University
CO ₂ PipeHAZ (2.07 M€)	Quantitative Failure Consequence Hazard Assessment for Next Generation CO ₂ Pipelines	Dalian University of Technology

*** EU-China Workshop on Innovative CCS Technologies on 19-20 September 2011 in Beijing organised by iCap**

Public Awareness and Acceptance

- The deployment of CCS will not take place without public acceptance at local level
- Research is needed to understand the nature of various public concerns (e.g. environmental, ethical, economic, cultural...) and mechanisms
- CCS Project Network, ZEP and FP projects play an important role in public outreach
- FP Research projects: *ACCSEPT, NEARCO2, FENCO-ERANET, SiteChar, CO2GeoNet, CGSEUROPE, 1 in negotiation*
- **AAAS-2012 Annual Meeting:** 16-20 February, Vancouver
“CCS: A Global Solution to a Global Challenge”



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 has to be ensured at an international level**
- **Extension to other carbon-intensive industries is needed**
- **Public awareness and understanding of CCS needs to be addressed at an early stage**