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EU-supported Research, Development and Demonstration Activities in Clean Coal and CCS

European Commission, DG Research

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Presented by Trygve U. Riis,
CSLF Technical Group meeting,
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Energy RTD&D in FP7

Implemented jointly by DG Research and DG Energy and Transport

Hydrogen and fuel cells

**CO2 capture and storage
technologies for zero
emission power generation**

**Renewable
electricity
generation**

**Clean coal
technologies**

**Renewable
fuel production**

**Smart energy
networks**

**Renewables
for heating and cooling**

**Energy savings
and energy efficiency**

Knowledge for energy policy making



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Highlights of our activities in Clean Coal and Carbon Capture & Storage

The EU Framework Programmes...

- ✓ **About 86 M€ spent on CCT and CCS in FP5 and FP6**
- ✓ **More than 54 M€ spent/earmarked so far in FP7**

... and more

- ✓ **European Technology Platform on Zero Emission Fossil Fuel Power Plants was launched on 1 December 2006**
- ✓ **Membership in the Carbon Sequestration Leadership Forum (CSLF) and the International Energy Agency (IEA)**
- ✓ **Bilateral cooperation** in the frame of agreements on science and technology with e.g. US, Japan, China, India, Canada, Australia. MoU with China on Near Zero Emission Coal Power Generation



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Current level of funding (FP7)

More than 54 M€ spent or earmarked for CCS/CCT so far on:

- Advanced capture techniques
- Transport infrastructure
- Qualification of deep saline aquifers
- Storage safety
- Public acceptance
- Gas turbines in IGCC power plants; oxyfuel combustion; fluidised bed combustion
- Feasibility/engineering study for a CCS demonstration plant (CCS part)
- Efficiency increases in pulverized coal power plants
- Support to regulatory activities for CCS
- Development of a value chain for CO₂ and for GHG emissions other than CO₂

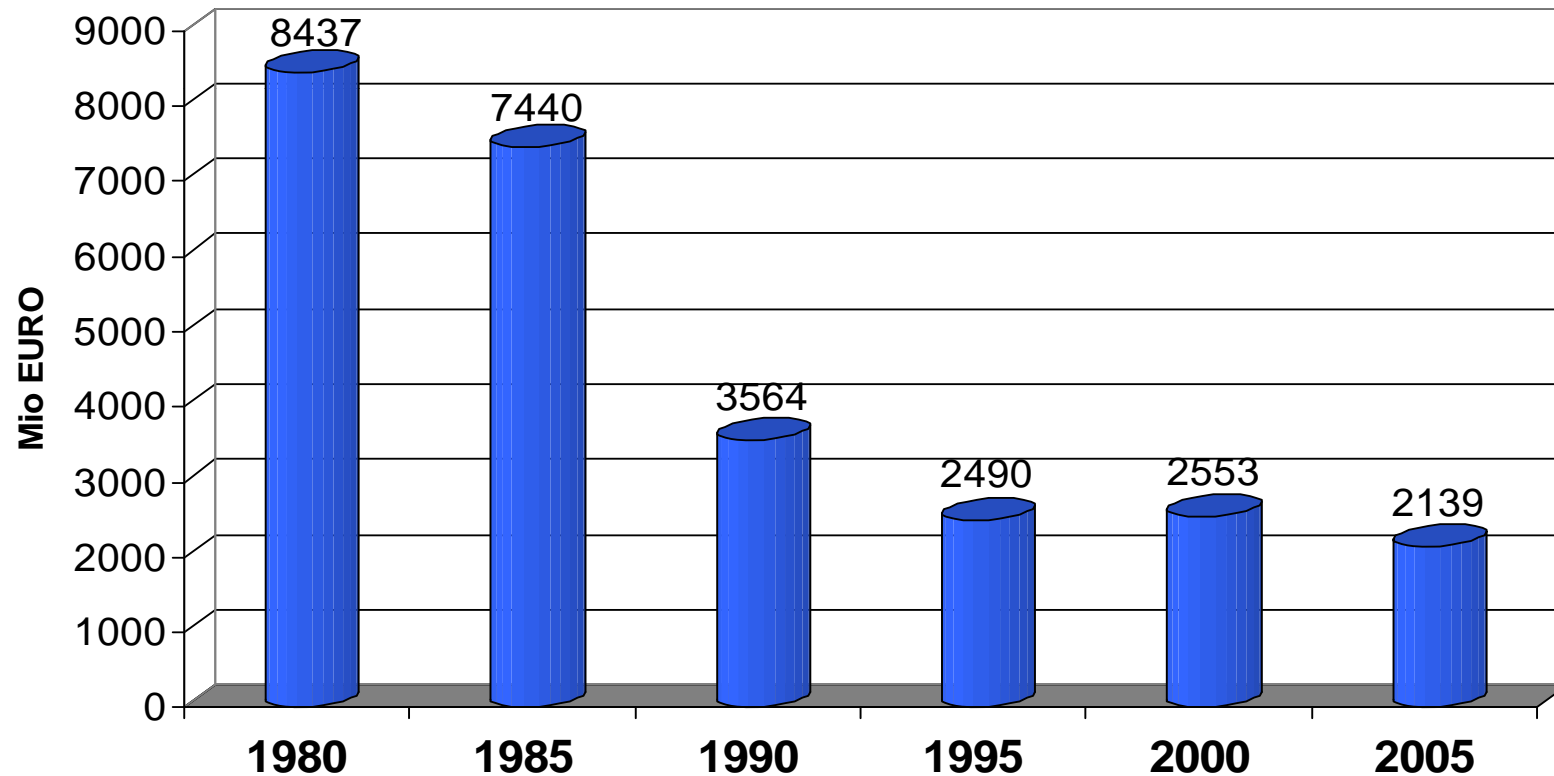


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We are not doing enough

Energy RTD investment declined substantially since 1980s



Calculations based on the Eurostat databases GBOARD



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Change from “business as usual”

**Technology is vital to achieve the ambitious aims of the
Energy and Climate Change package (3 x 20%)**



- ✓ **Time is of the essence**
- ✓ **While successful, the Framework Programme is NOT sufficient to meet the challenges**
- ✓ **A collective action of all interested countries and involved stakeholders is needed**



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Our answer: the SET-Plan

European Strategic Energy Technology Plan

The essence of the SET-Plan

- ✓ **A tool to reach ambitious EU energy policy objectives**

The main elements

- ✓ **Joint strategic planning**
- ✓ **Increase in resources, both financial and human.**
- ✓ **Reinforced international cooperation**
- ✓ **Effective implementation: European Industrial Initiatives**



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Basic principles of European Industrial Initiatives

- ✓ **Led by industry**
- ✓ **Share risk: pool public and private financing**
- ✓ **Boost research and innovation**
- ✓ **Accelerate deployment of technology**
- ✓ **Deliver progress beyond business-as-usual**
- ✓ **Define & realise clear targets (quantified objective)**
- ✓ **Contribute to political goals (energy & climate change)**



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European Industrial Initiatives

Ells process: where are we?

Achieved

- Industry proposal developed by Technology Platforms with the aid of the EC
- Workshop with Member States – agree objectives and main activities
- Definition of the Technology Roadmaps and discussion during the SET Plan Conference in October 2009 (SW)

Ongoing

- Decisions on MS participation and modalities: concept of joint programme
- Definition of model and structure of implementation (no single, pre-determined model and structure of implementation)
 - Plan to launch in 2010



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A European Industrial Initiative on Carbon Capture and Storage



Objective:

- ✓ Demonstrating CCS at full-scale...
- ✓ through a set of plants (~300 MW) with different capture, transport and storage options...
- ✓ with a relevant geographical spread...
- ✓ to prepare the way for fully commercial implementation



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Financing CCS demonstration

✓ **Recovery Plan**

- ✓ €1.05 bn for CCS demonstration projects
- ✓ Up to 7 projects, 1 project max per MS
- ✓ Max €180 million per project for additional investment related expenditures for CCS
- ✓ Limited Call for proposals: 18 May 2009
- ✓ 6 projects have been selected

✓ **300 million allowances from ETS (NER)**

- ✓ Fully complementary to EEPR
- ✓ First funding decisions expected in 2011



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Project network: an immediate EU structure

✓ **CCS Project Network main goals:**

- ✓ Accelerate the deployment of CCS on an industrial scale
- ✓ Benefit from knowledge sharing, joint communication activities and a European identity

✓ **CCS Project Network main tasks:**

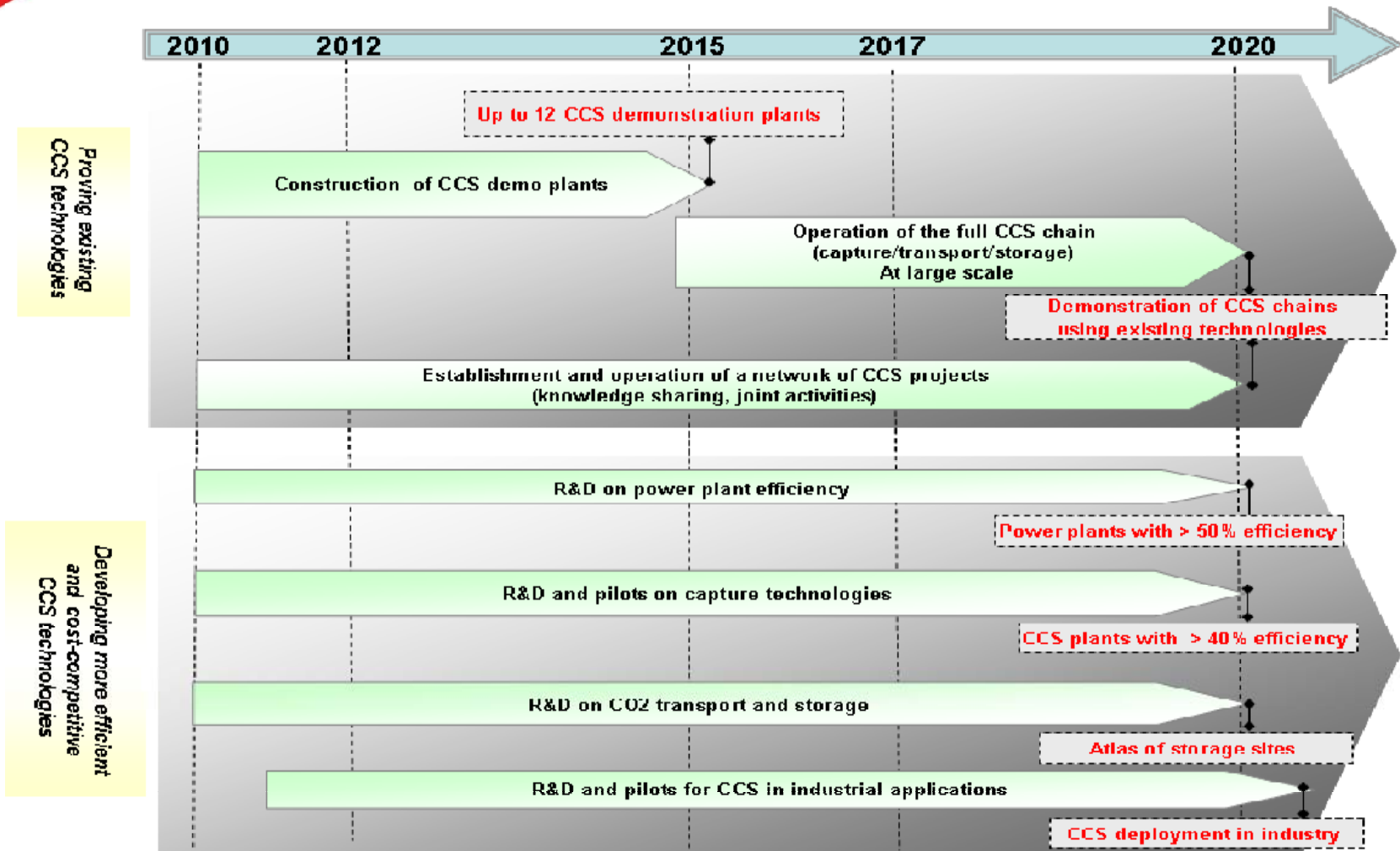
- ✓ Co-ordination of EU CCS demonstration projects
- ✓ Communicate concrete results from the projects
- ✓ Actions to build public confidence
- ✓ Promote international cooperation
- ✓ We will start now with the 6 demo-plants from the Recovery Package



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EII on CCS – Technology Roadmap





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What does this mean for FP7?

Call ENERGY-2010-1

- ✓ **Demonstration of advanced capture technologies**
- ✓ **Site characterisation**
- ✓ **Site abandonment**
- ✓ **Trans-national cooperation (BE partner)**

Work Programme 2011: some preliminary thoughts

- ✓ **New liquid solvents for post-combustion capture?**
- ✓ **Understanding the long-term fate of stored CO₂?**
- ✓ **IGCC for high-ash coal (India, China, South Africa)?**



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Summary (1)

EU CCS actions to date

- ✓ **2000 - ... Building on earlier activities (FP5-FP7)**
Research
- ✓ **2008 CCS and ETS Directives**
Legislation
- ✓ **2009 European Energy Plan for Recovery (EEPR)**
Demonstration (promotion)
- ✓ **2010 CCS project network to have first members**
Demonstration (coordination)
- ✓ **2010 Launch of the European Industrial initiative on CCS**
Research and Demonstration (public-private)
- ✓ **2011/2012 ETS New Entrance Reserve (NER)**
Demonstration (robust EU programme)



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Summary (2)

Research, Development and Demonstration

- ✓ **Framework Programmes have considerably advanced CCS technologies**
- ✓ **Industrial stakeholders have played an important role (e.g. ETP ZEP)**
- ✓ **We now need to demonstrate the full chain of CCS**
- ✓ **This requires a balanced portfolio of demonstrators, using different technologies, with a geographical spread...**
- ✓ **... complemented by research to advance the state of CCS technology and support the demonstrators**
- ✓ **Start with power plants, but extend to other carbon-intensive industry**
- ✓ **FP7 will support the implementation of the EII for CCS**
- ✓ **International cooperation with (1) US, AU, CA, JA; (2) CH, IN & SA**



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Key messages

Commission calls for:

- ✓ **An increase in investment – public and private – for the development of low carbon technologies**
- ✓ **Support for the Technology Roadmaps as the basis for launching the Industrial Initiatives**
- ✓ **Focus Community programmes on the SET-Plan initiatives, including through joint programming**
- ✓ **A new look at financial engineering for large projects and early market replication**