



Near Term Opportunities for Carbon Capture and Storage

IEA Executive Perspective

Neil Hirst
Director, Office of Energy Technology and R&D
International Energy Agency

G8-IEA-CSLF Workshop
San Francisco, 22-23 August 2006





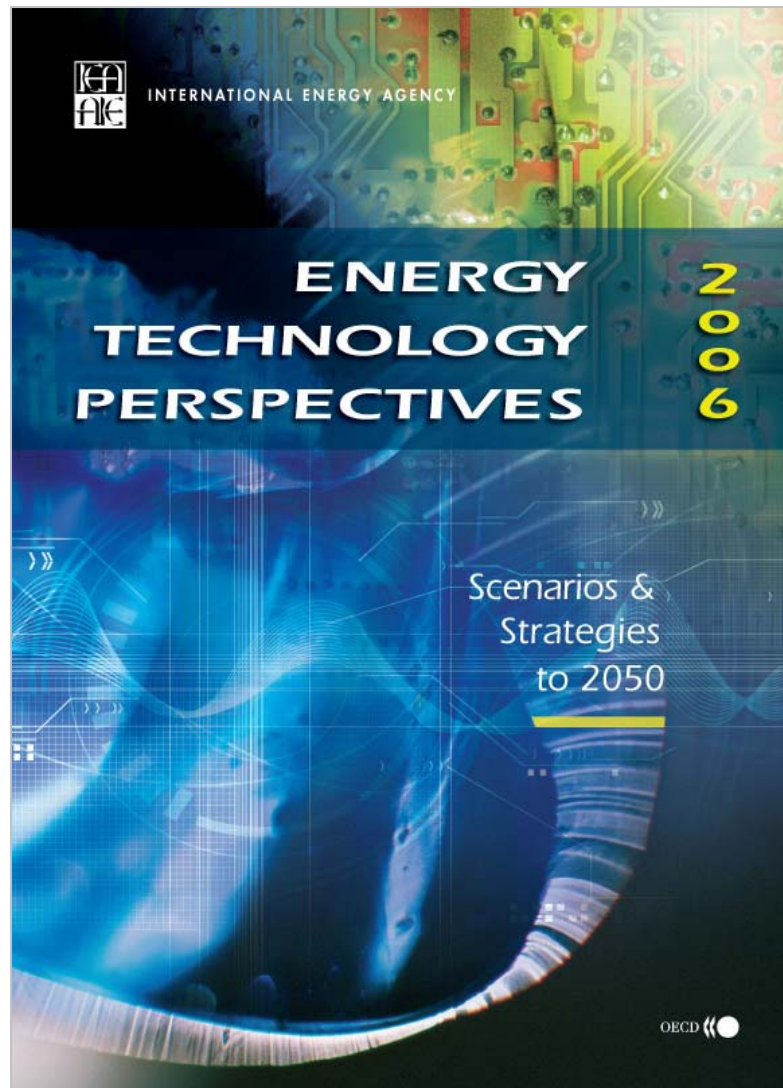
IEA and this workshop

In its final Gleneagles Plan of Action of 7-8 July 2005, the G8 stated:

“We will work to accelerate the development and commercialization of Carbon Capture and Storage technology by:

...inviting the IEA to work with the CSLF to hold a workshop on short term opportunities for CCS in the fossil fuel sector, including from Enhanced Oil Recovery and CO2 removal from natural gas production...”

Energy Technology Perspectives 2006





Why this new publication?

- Because we are not on a path towards a sustainable energy future
- IEA's Governing Board and G8 leaders have asked IEA to:

“Advise on scenarios and strategies for a clean, clever and competitive energy future”
- Past IEA analyses have indicated that individual technologies can make significant contributions
- *Energy Technology Perspectives* provides a comprehensive review of technologies across all sectors and assess how they together can make a difference

Scenario analysis

■ Scenarios analysed:

- **Baseline Scenario**
- **Accelerated Technology Scenarios (ACT)**
- **TECH Plus scenario**

■ ACT and TECH Plus scenarios:

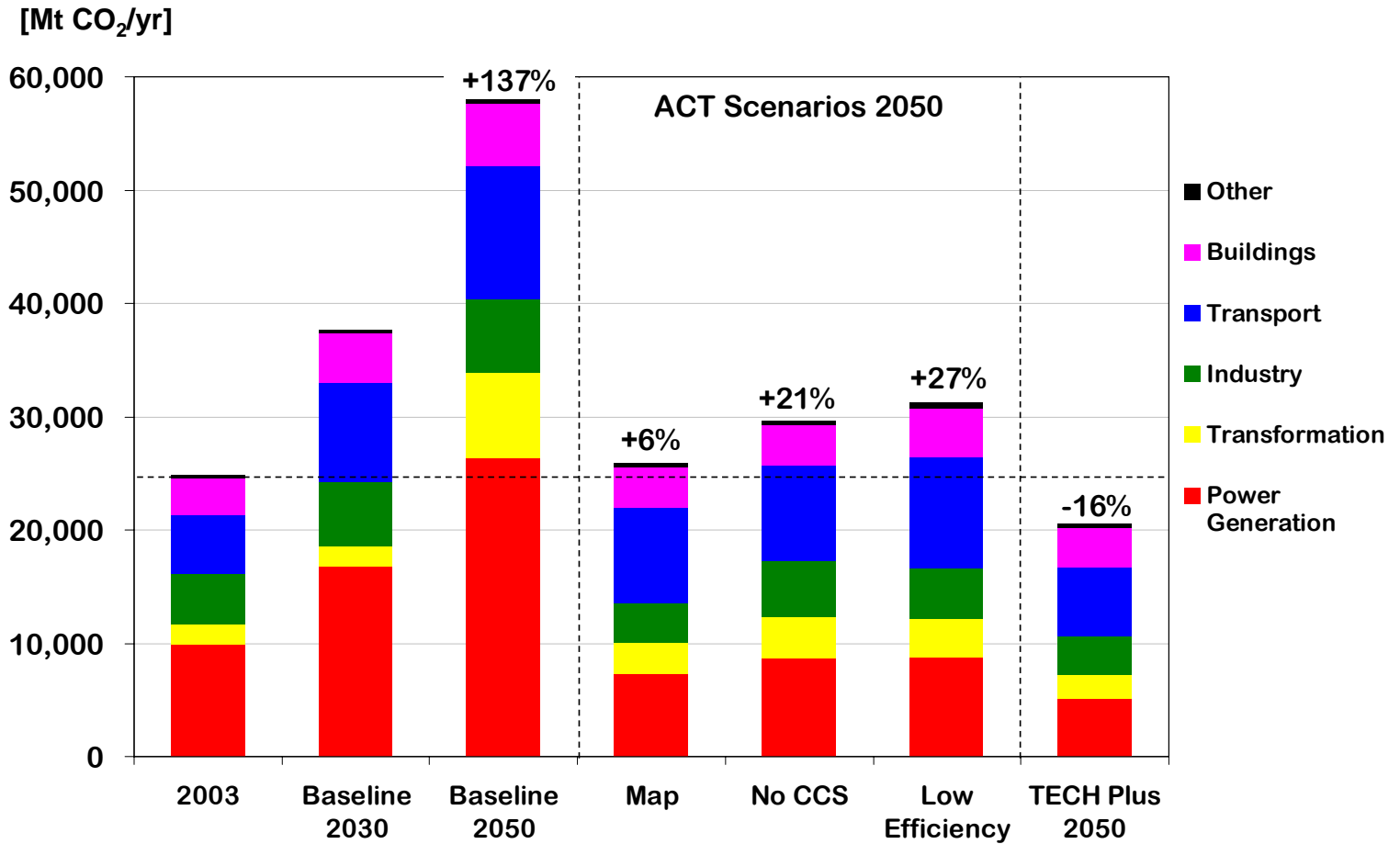
- **Investigate potential of technologies and best practices**
- **Analyse the impact from R&D, Demonstration and Deployment measures**
 - ◆ **Incentives equivalent to 25 USD/tonne CO₂ for low-carbon technologies implemented world-wide from 2030 onwards**
 - ◆ **Individual scenarios differ in terms of assumptions for key technologies**





Global CO₂ emissions 2003-2050

Baseline, ACT and TECH plus scenarios

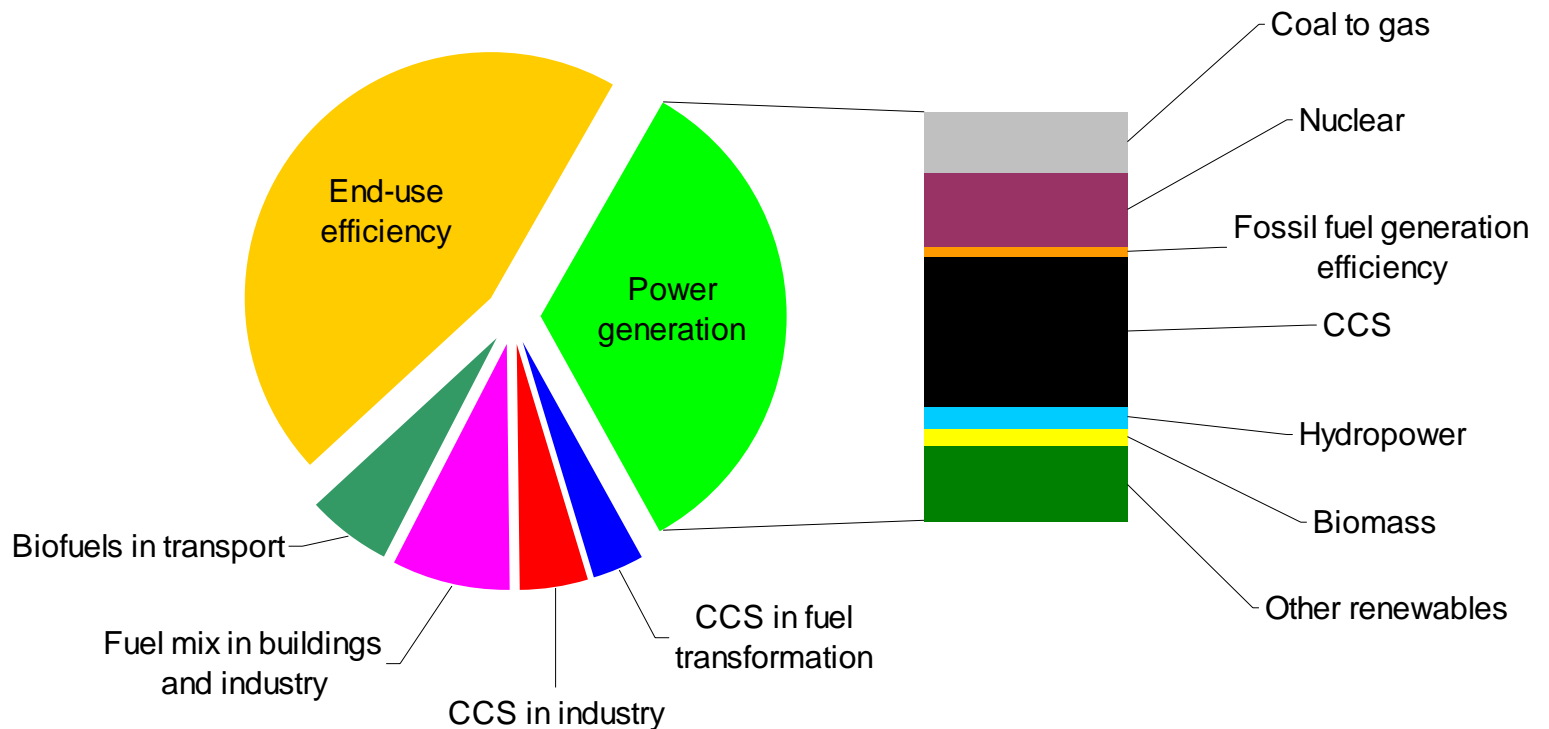


CO₂ emissions can be returned to current levels through a portfolio of technologies



Emission reduction by technology area

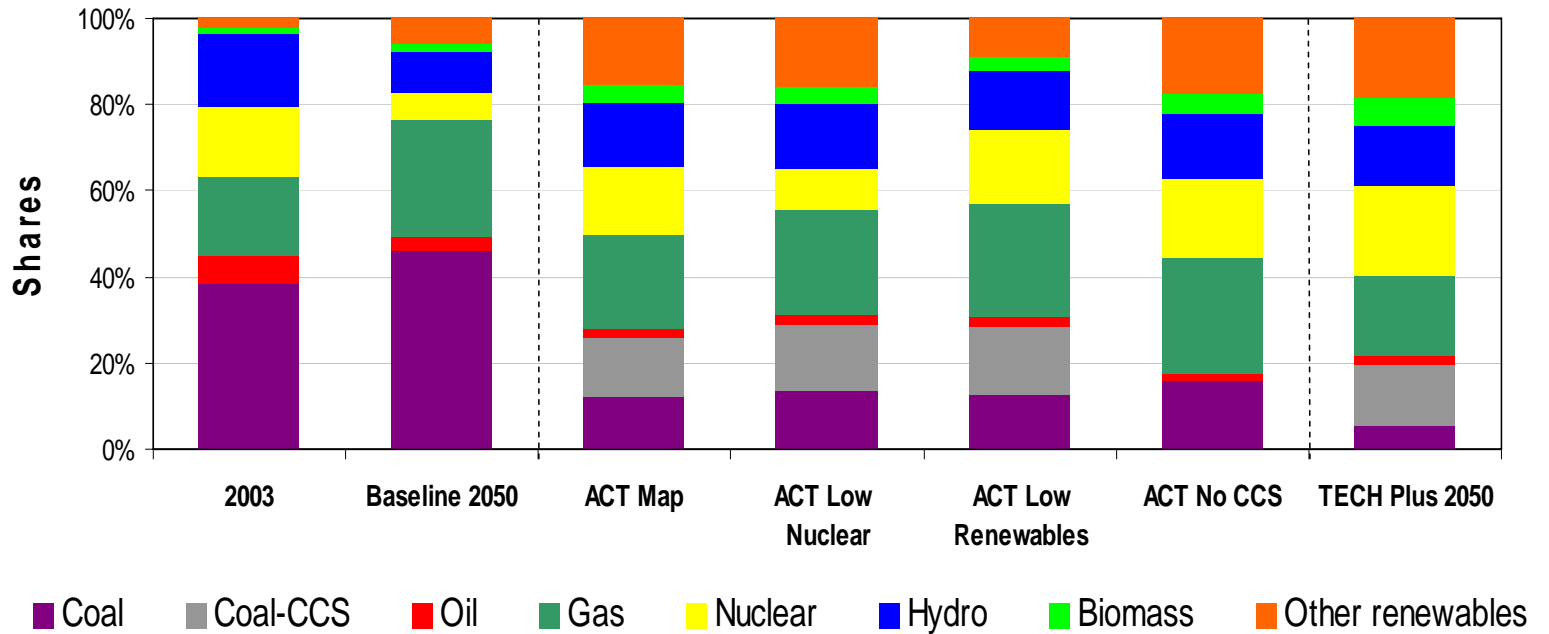
ACT Map Scenario



Improved energy efficiency most important contributor to reduced emissions, CCS accounts for 20% of Act Map emissions reduction

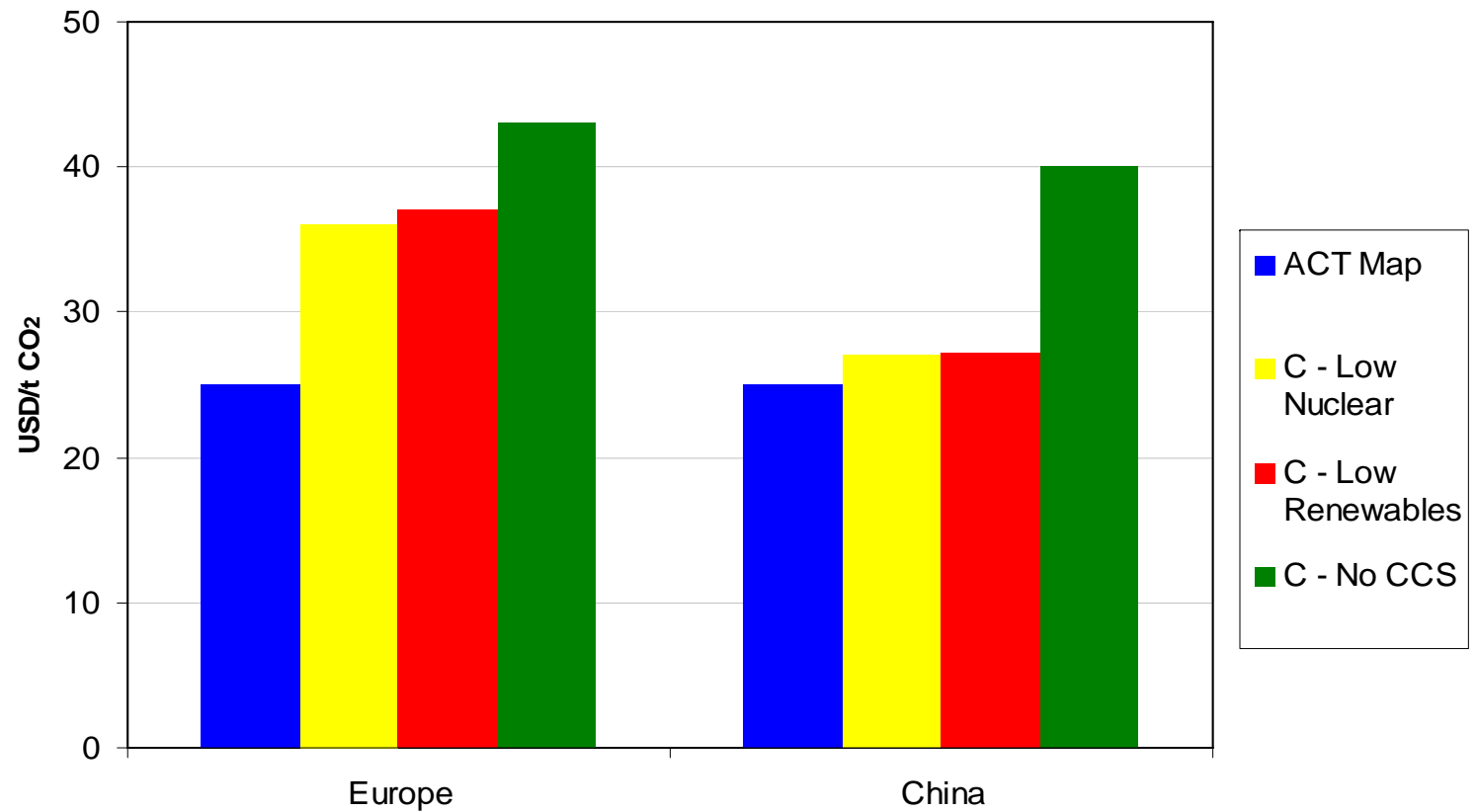


Global Electricity Generation by Fuel



ACT Scenarios: Important role for CCS and strong growth in the shares for renewables and nuclear

Impact of technology assumptions on marginal emission abatement costs



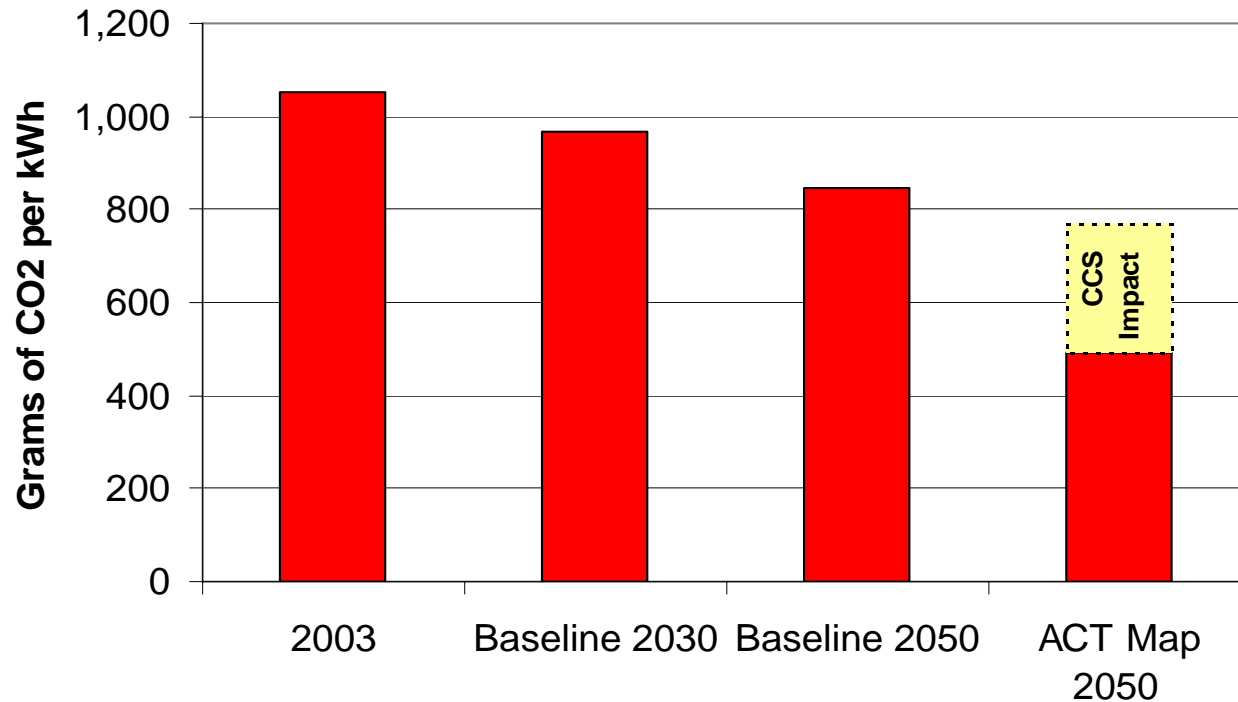
Absence of CCS significantly increases marginal cost of CO₂ emissions reduction

CO₂ intensity of coal-fired power generation China 2003 - 2050

ENERGY
TECHNOLOGY
PERSPECTIVES

2006

Scenarios & Strategies
to 2050



More than 50% reduction in CO₂ intensity due to improved generation efficiency and CCS



Key findings

- **Most energy still comes from fossil fuels in 2050**
- **CO₂ emissions can be returned towards today's level by 2050**
- **Growth in oil and electricity demand can be halved**
- **Improving energy efficiency is top priority**
- **CCS is key for a sustainable energy future**
 - **Power generation**
 - **Industry and fuel transformation (40% of CCS potential)**
- **Other important technologies:**
 - ◆ **Renewables, including biofuels**
 - ◆ **Nuclear**
 - ◆ **Efficient use of natural gas**
 - ◆ **In time, and with effort, hydrogen and fuel cells**

Costs

- **25 USD/tonne CO₂ incentive is upper limit for the incremental costs of using the technologies needed**
- **Significant transitional costs for RD&D and deployment programs**
- **Improved energy efficiency substantially reduces need for supply side investments and fuel imports**
 - **Electricity sector: demand-side savings offset most of the additional investment costs for power generation**
- **Progress in efficiency and CCS key to keep mitigation costs down**



Policy implications

- **A more sustainable energy future is possible with known technology**
- **Costs should not be considered:**
 - disproportionate
 - a deterrent
- **But urgent action is needed in public and private sectors:**
 - overcome barriers for adoption of energy efficient technologies, both economic and non-economic
 - enhance R&D
 - speed demonstration and deployment, especially for CCS
- **Collaboration between developed and developing countries essential**





This workshop

A chance for stakeholders to

- **Work together**
- **Seize strategic opportunities to advance CCS**
 - **continued strong future role of fossil fuels**
 - **ageing power generation capacity**
 - **fast growing needs of expanding economies**
 - **urgent need for demonstration**

A forum to generate input for recommendations to G8 leaders



Thank you