



The Role of CCS in Climate Change Mitigation

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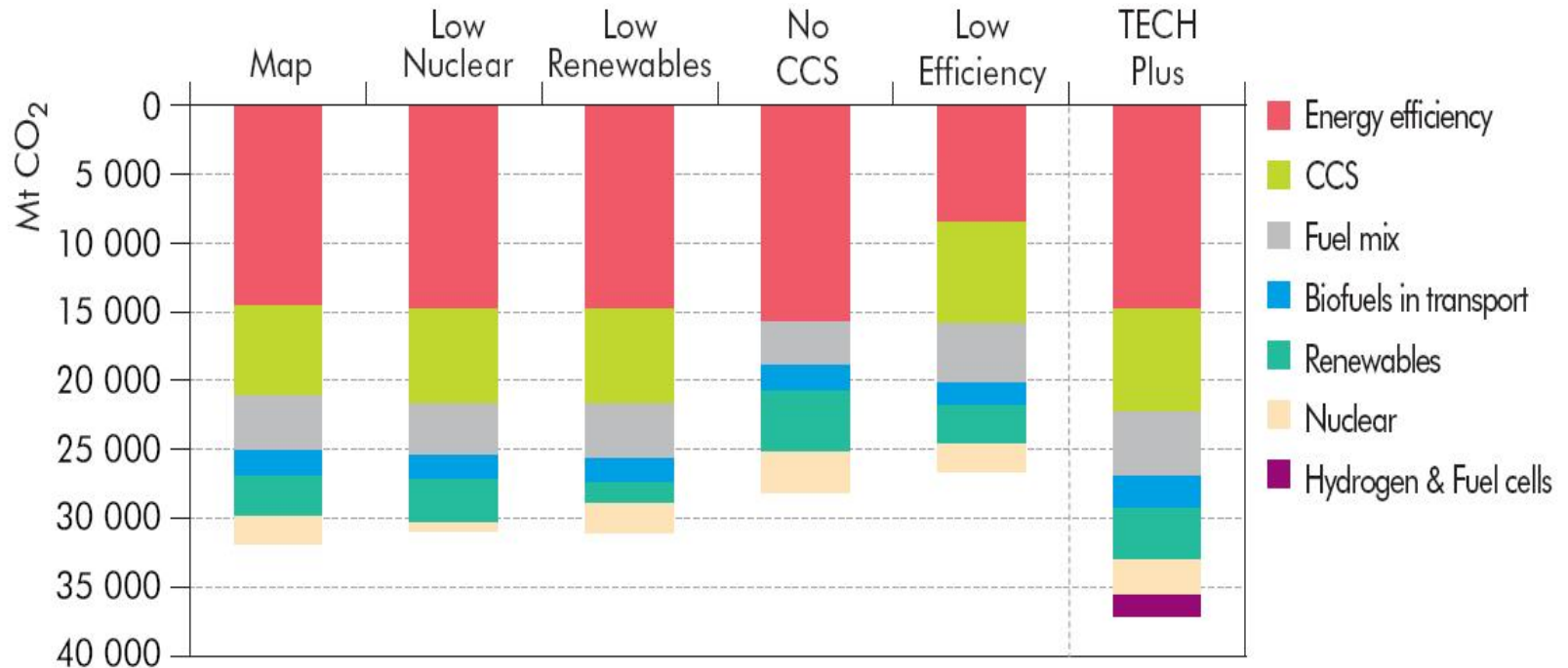
G8 Summit in Heiligendamm

Accelerating Development and Deployment of CCS

- **prioritising national and international R&D efforts (...)**
- **encouraging RD&D of clean coal technologies (...)**
- **supporting national and international geoscientific and political efforts (...)**
- **reinforcing (...) commitment made under the Gleneagles and St. Petersburg Plans of Action to support the initiatives taken by the IEA and CSLF**
- **encouraging (...) governments to design mechanisms to stimulate the construction and operation of a growing number of large-scale demonstrations of sustainable fossil fuels technologies in commercial power generation**
- **encouraging industry to consider the concept of capture ready when developing new fossil fuel power plant**

CO₂ Emission Reductions by 2050

Where is the Potential?



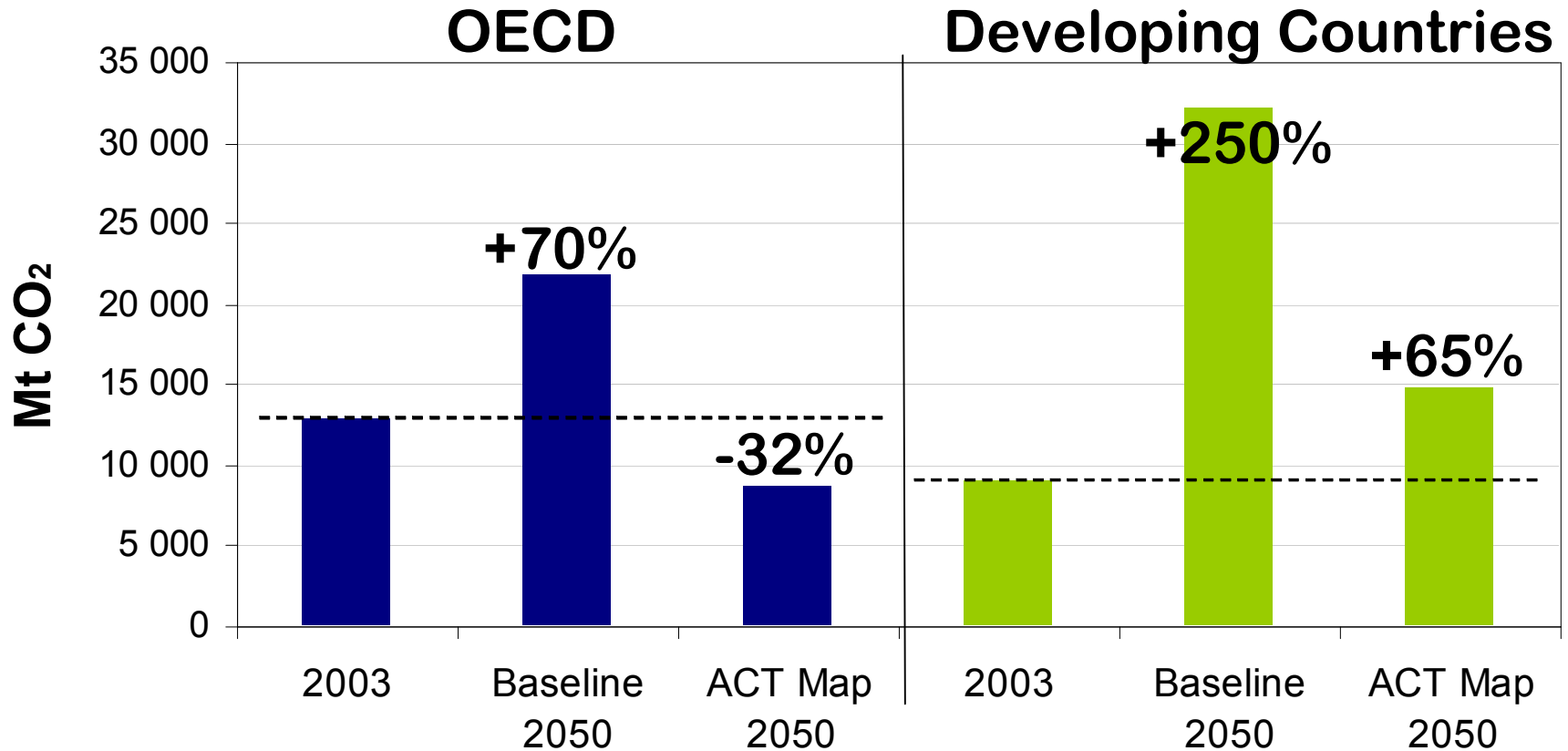
Energy efficiency is the single largest contributor to CO₂ reductions – and cost-effective



IEA Energy Technology Perspectives

CO₂ Emissions

Baseline and Map Scenarios



Map: OECD Emissions 32% below 2003 level, while emissions in Developing Countries are 65% higher.

IEA Energy Technology Perspectives



Emission reduction by sectors

MAP Scenario:
32 Gt CO₂ reduction in 2050

Industry 10%

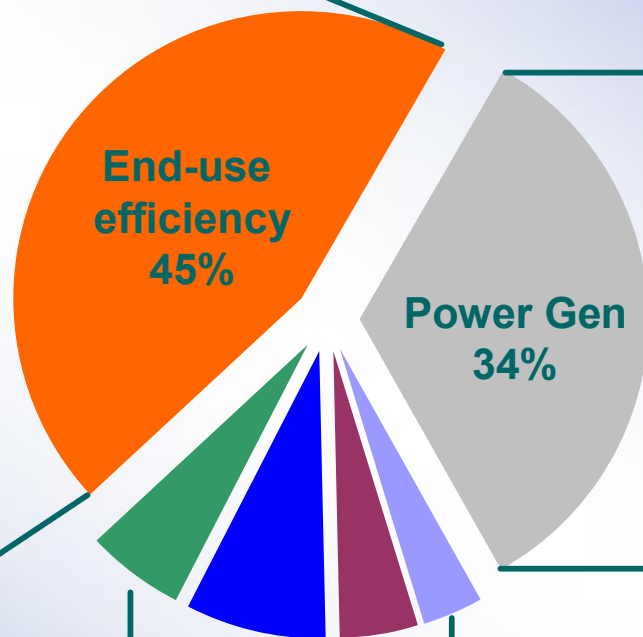
- Energy & feedstock effic. 6%
- Materials & products effic. 1%
- Process innovation 1%
- Cogen. & steam 2%

Buildings 18%

- Space heating 3%
- Air conditioning 3%
- Lighting, misc. 3.5%
- Water heat., cooking 1%
- Appliances 7.5%

Transport 17%

- Fuel economy in transport 17%



- Coal to gas 5%
- Nuclear 6%
- Fossil fuel gen. eff 1%
- CCS 12%
- Hydro 2%
- Biomass 2%
- Other renew. 6%

Biofuels in transport 6%

CCS in fuel transformation 3%
 CCS in industry 5%
 Fuel mix in building 5% and industry 2%

CO₂ Capture & Storage (CCS) contributes 20% of total

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CCS Challenges - Developing thousands of Sleipner's by 2050

- Making new plants capture ready
 - ◆ agree on characteristics of capture-ready plants
 - ◆ urgency of introduction in fast developing economies
 - ◆ assessment of storage site suitability
 - ◆ incentives and/or regulations
- Predictable economic incentives in the medium and longer term
 - ◆ lack of a global and long-term value for CO₂
 - ◆ significant investment risks
- Relevant national and international legal and regulatory frameworks
 - ◆ classification of CO₂
 - ◆ liability
 - ◆ streamlined regulatory approaches for demonstration projects

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CCS Challenges (2)

- Favourable public perception
 - ◆ urgency of winning public acceptance of CCS as a safe and predictable mitigation option
 - ◆ need for transparency and high quality information
- Technology
 - ◆ Total cost of capture
 - efficiency of power production
 - cost of energy consumed
 - equipment for capture
 - ◆ Building the CO₂ Infrastructure
 - ◆ Proof for storage retention in different geological structures
 - risk assessment
 - monitoring
 - Verification
 - ◆ Avoiding the technology's "Valley of Death"
- Not missing the window of opportunity for CO₂-EOR



Accelerating CCS deployment

National and international policies should:

- Facilitate the development of CCS technologies through support of R&D and demonstration projects
 - 10 early full scale CCS demonstration projects by 2015
 - Develop selection criteria for international and national competitions for public co-funding of demonstration projects
- Facilitate the establishment of legal and regulatory frameworks
- Create a balanced policy framework that recognizes the potential of CCS along with other mitigation technologies
- Support public awareness campaigns

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Report to the G8 2007 Heilingindamm & 2008 Hokkaido

G8 Gleaneagles Plan of Action - July 2005

- **Workshop Series on Near-term Opportunities for CCS**
 - ◆ Issues/Opportunities Workshop (San Francisco, Aug 2006)
 - ◆ Assessment Workshop (Norway, June 2007)
 - ◆ Recommendations Workshop (Canada, Q4-2007)

- **Studies on 'capture ready' plant concept**
 - ◆ engineering study and policy document

- **Legal Aspects of Storing CO₂**
 - ◆ conference
 - ◆ recommendations

- **New tasks resulting from Heiligendamm Summit**

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IEA publication on Legal Aspects of Storing CO₂ Update and Recommendations



Key Messages:

- Urgency of need for full-scale demonstration projects to generate M&V data to guide development of legal & regulatory guidance
- Need to “fast track” projects via amending existing regulations (possible 2-tier approach)
- While UNFCCC process beginning to address inclusion of CCS, more needs to be done
- International marine environment protection instruments are making important progress

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