



Third International Conference on Clean Coal Technologies for our Future

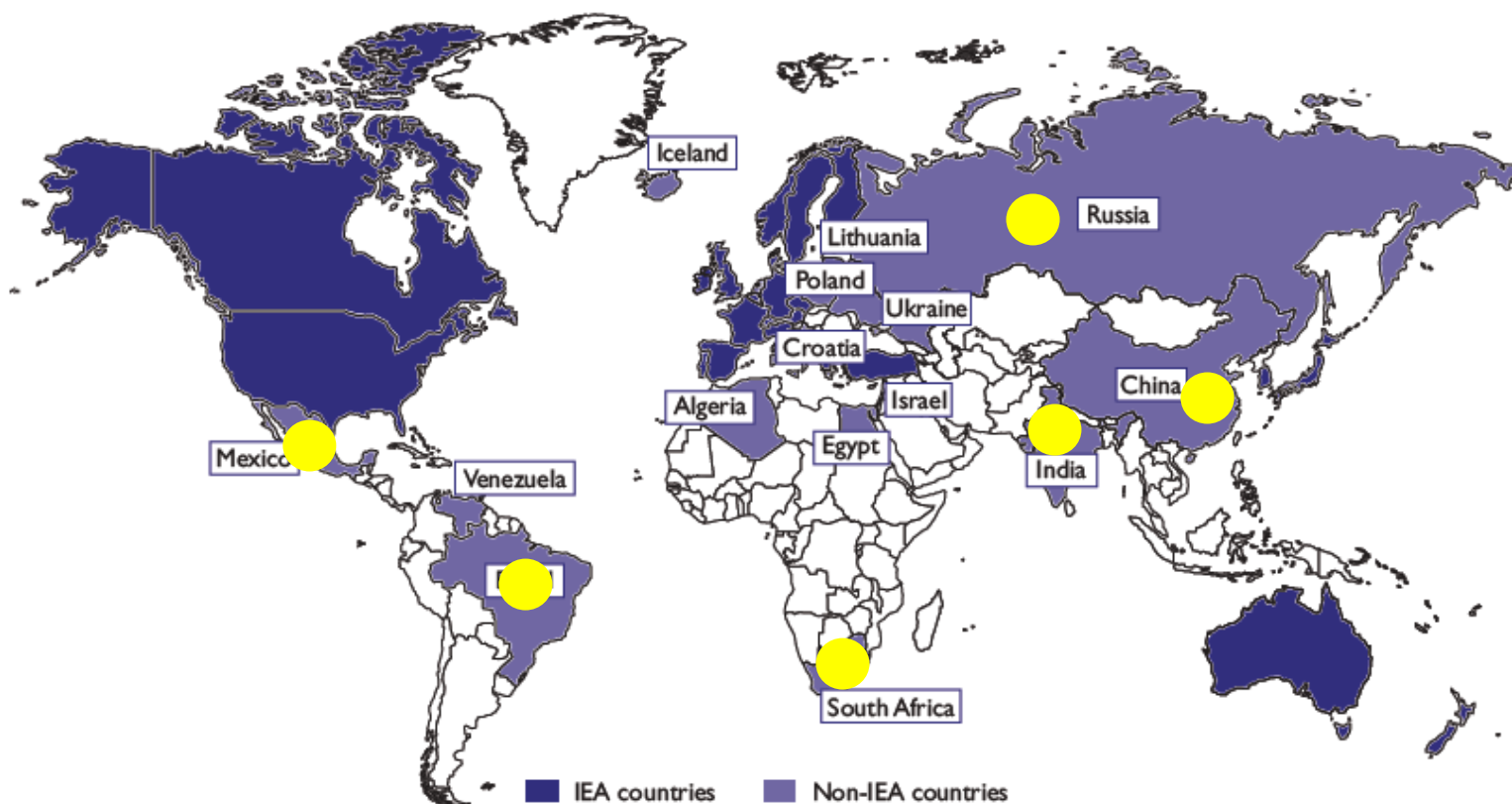
Cagliari, 15-17 May 2007

Keynote Session on Coal Policies and Energy Security

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Head, Energy Technology Collaboration Division
International Energy Agency**

Enhancing Technology Collaboration

Global Energy Technology Network



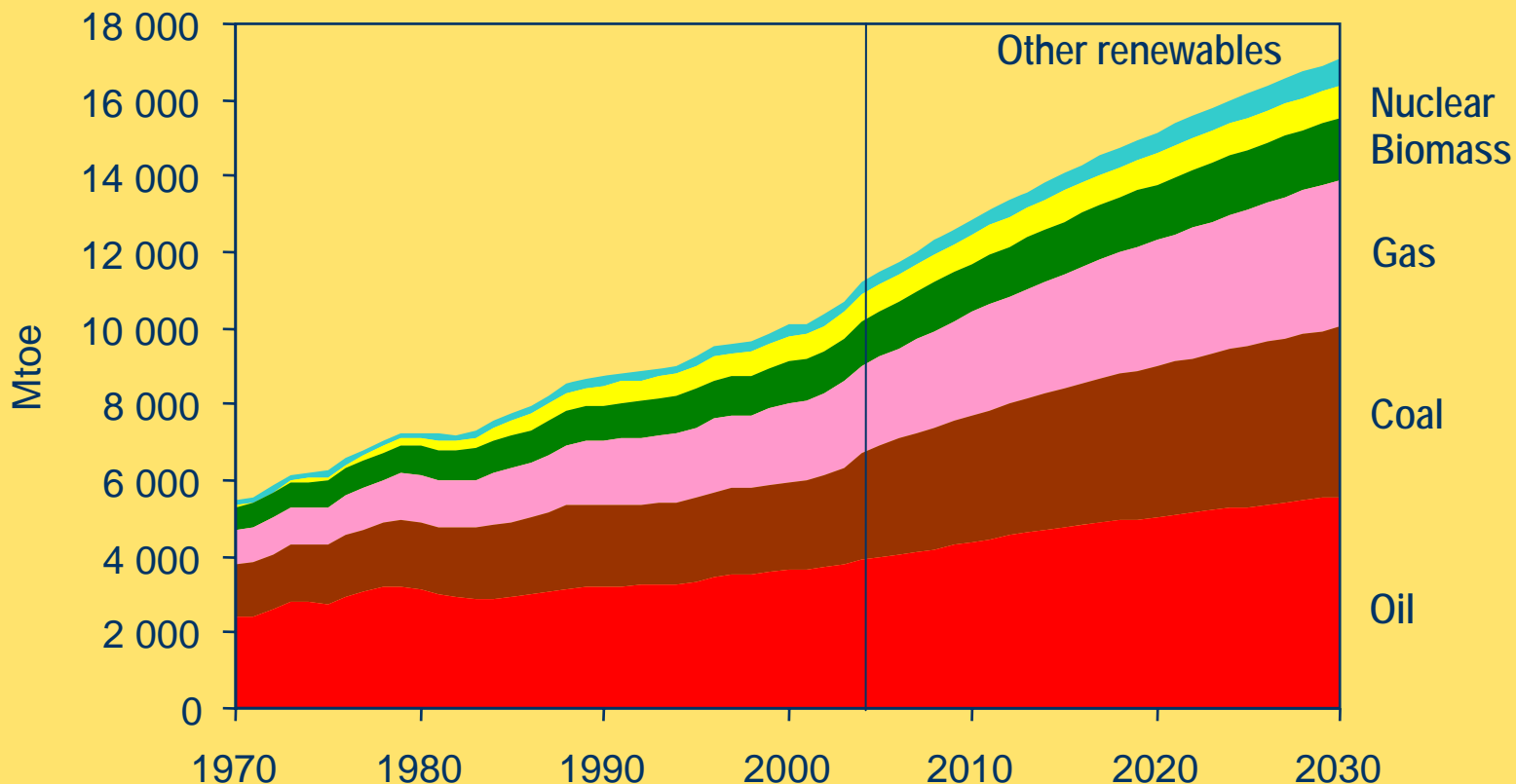
The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.



Enhanced Technology Collaboration

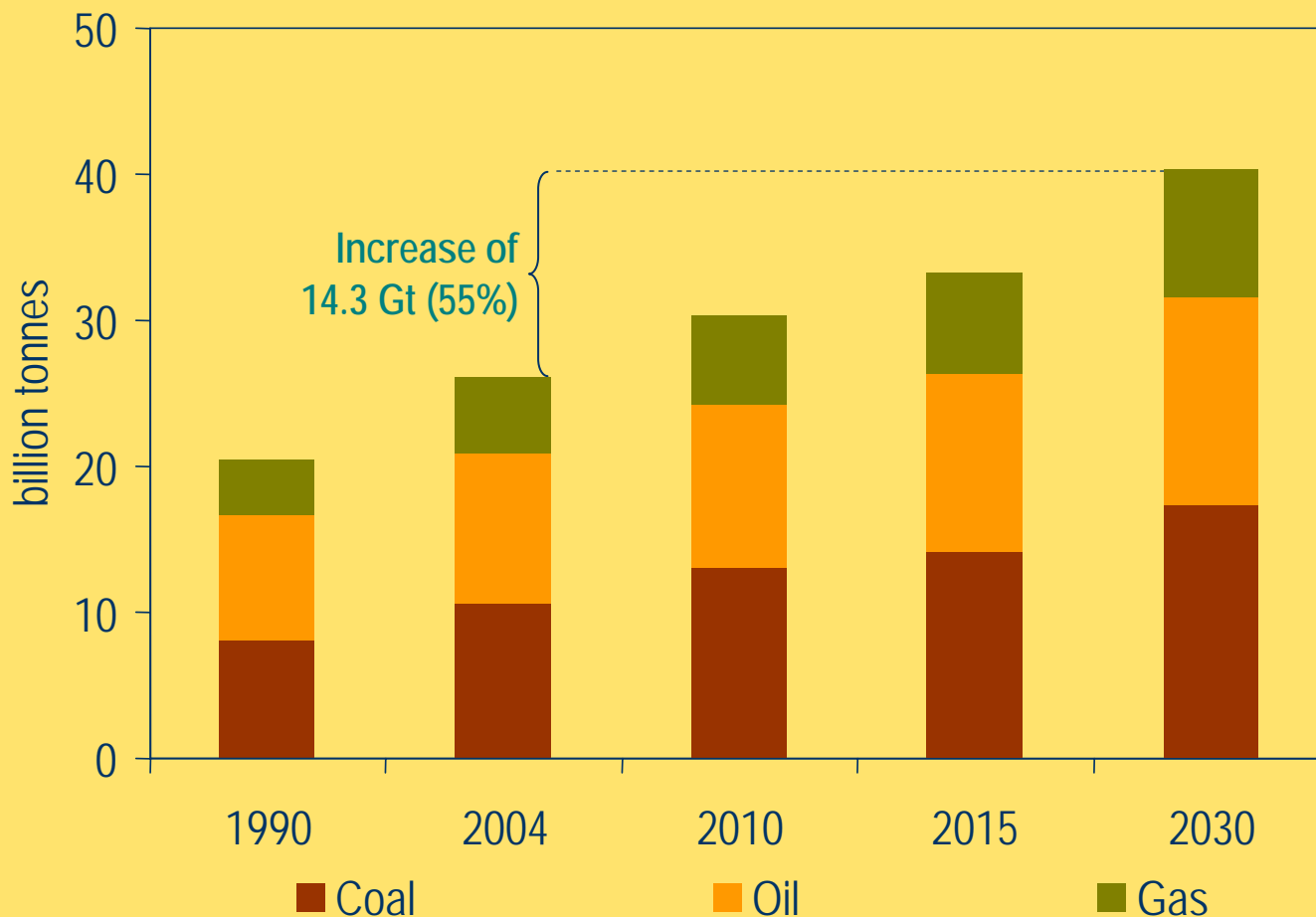
More information: www.iea.org/neet

Reference Scenario: World Primary Energy Demand



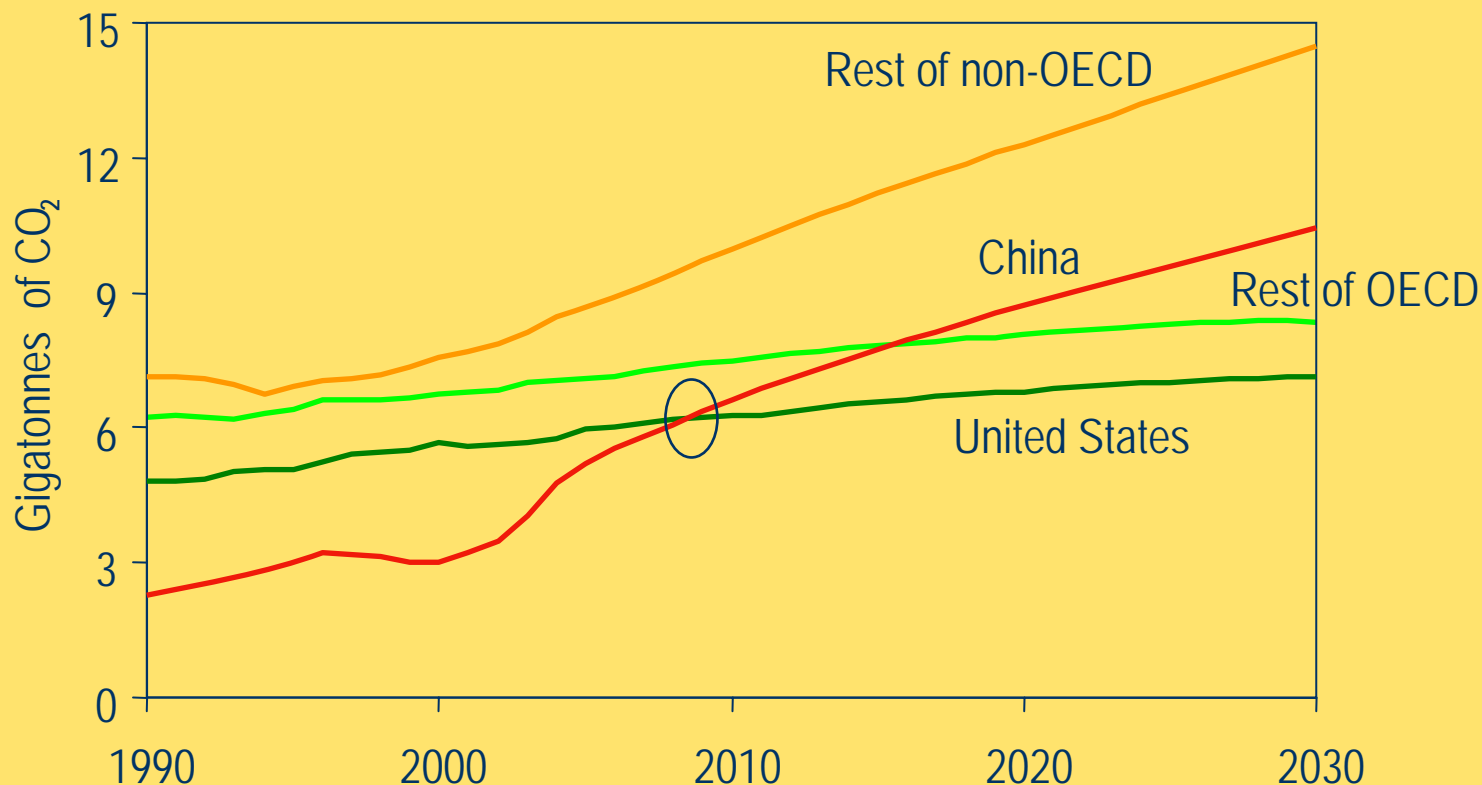
Global demand grows by more than half over the next quarter of a century, with coal use rising most in absolute terms

Reference Scenario: Energy-Related CO₂ Emissions by Fuel



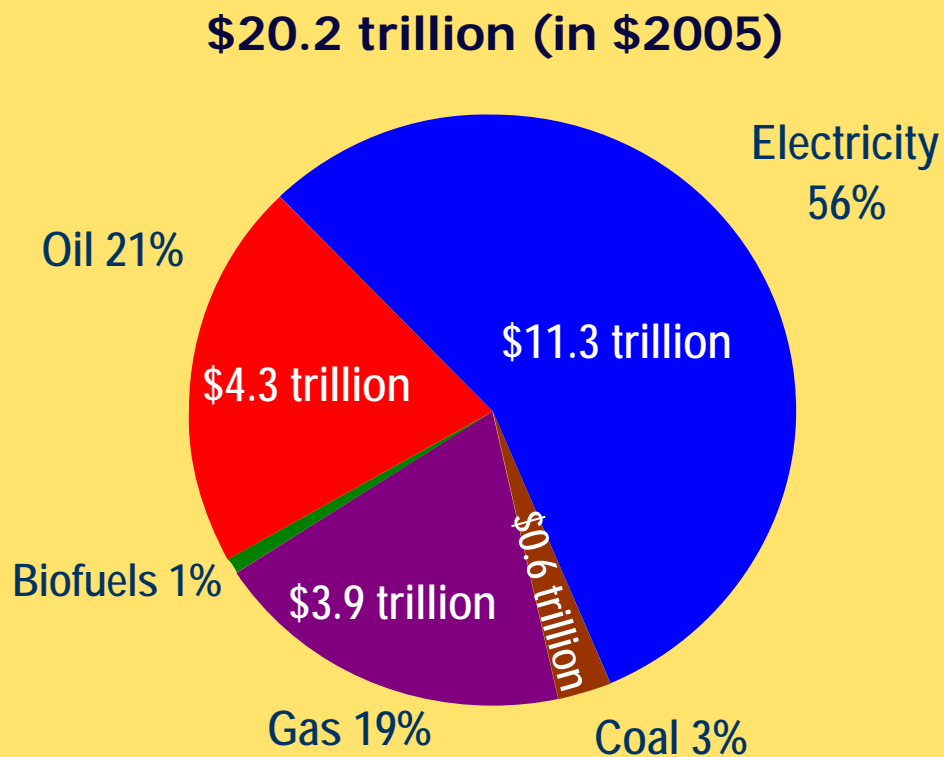
Half of the projected increase in emissions come from new power stations, mainly using coal & mainly located in China & India

Reference Scenario: Energy-Related CO₂ emissions by Region



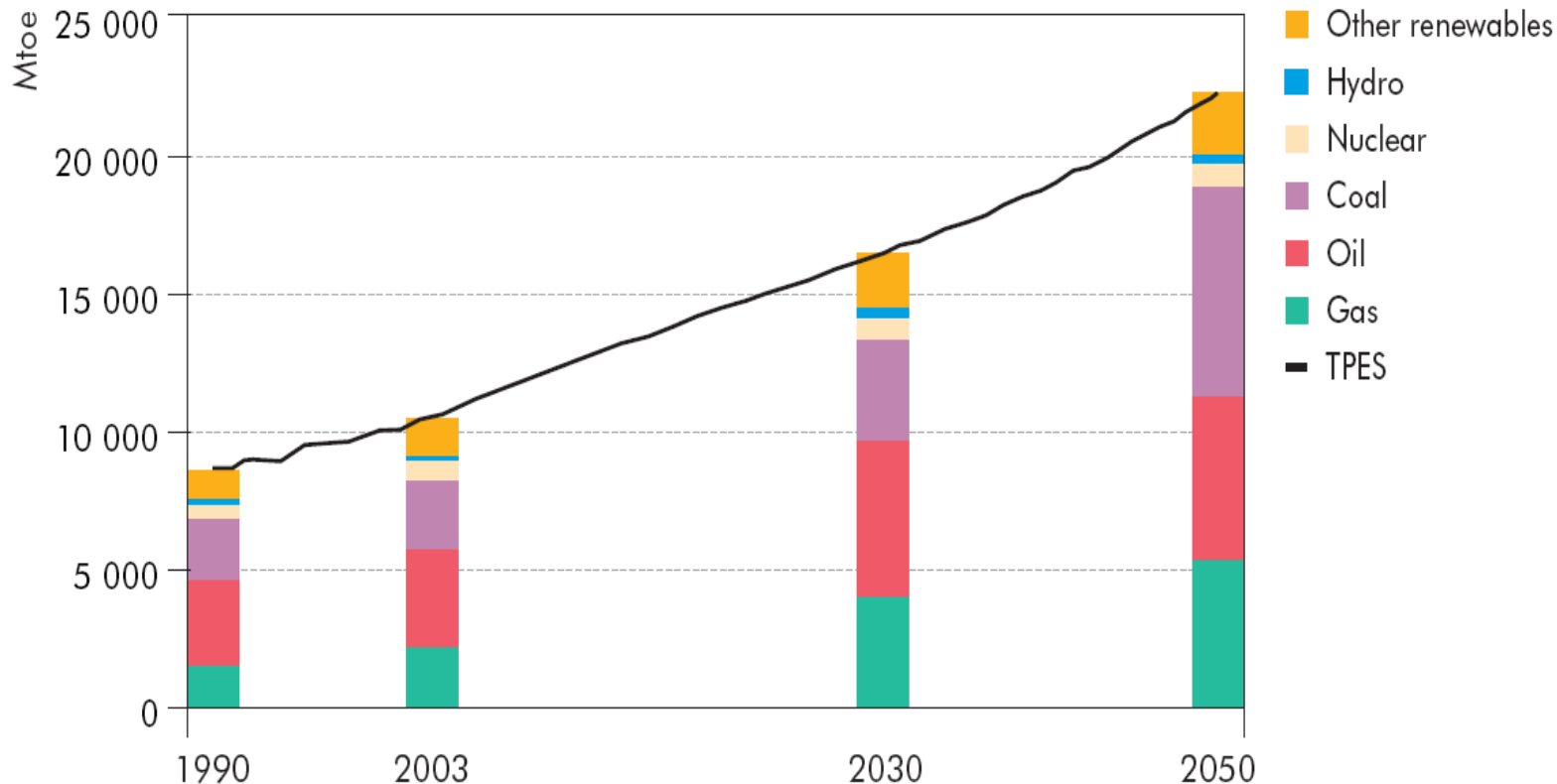
China overtakes the US as the world's biggest emitter before 2010, though its per capita emissions reach just 60% of those of the OECD in 2030

Reference Scenario: Cumulative Investment, 2005-2030



Investment needs exceed \$20 trillion – \$3 trillion more than previously projected, mainly because of higher unit costs

World Total Primary Energy Supply by Fuel in the ETP Baseline Scenario 2003-2050



Primary energy use more than doubles between 2003 and 2050, with a very high reliance on coal

ENERGY
TECHNOLOGY
PERSPECTIVES

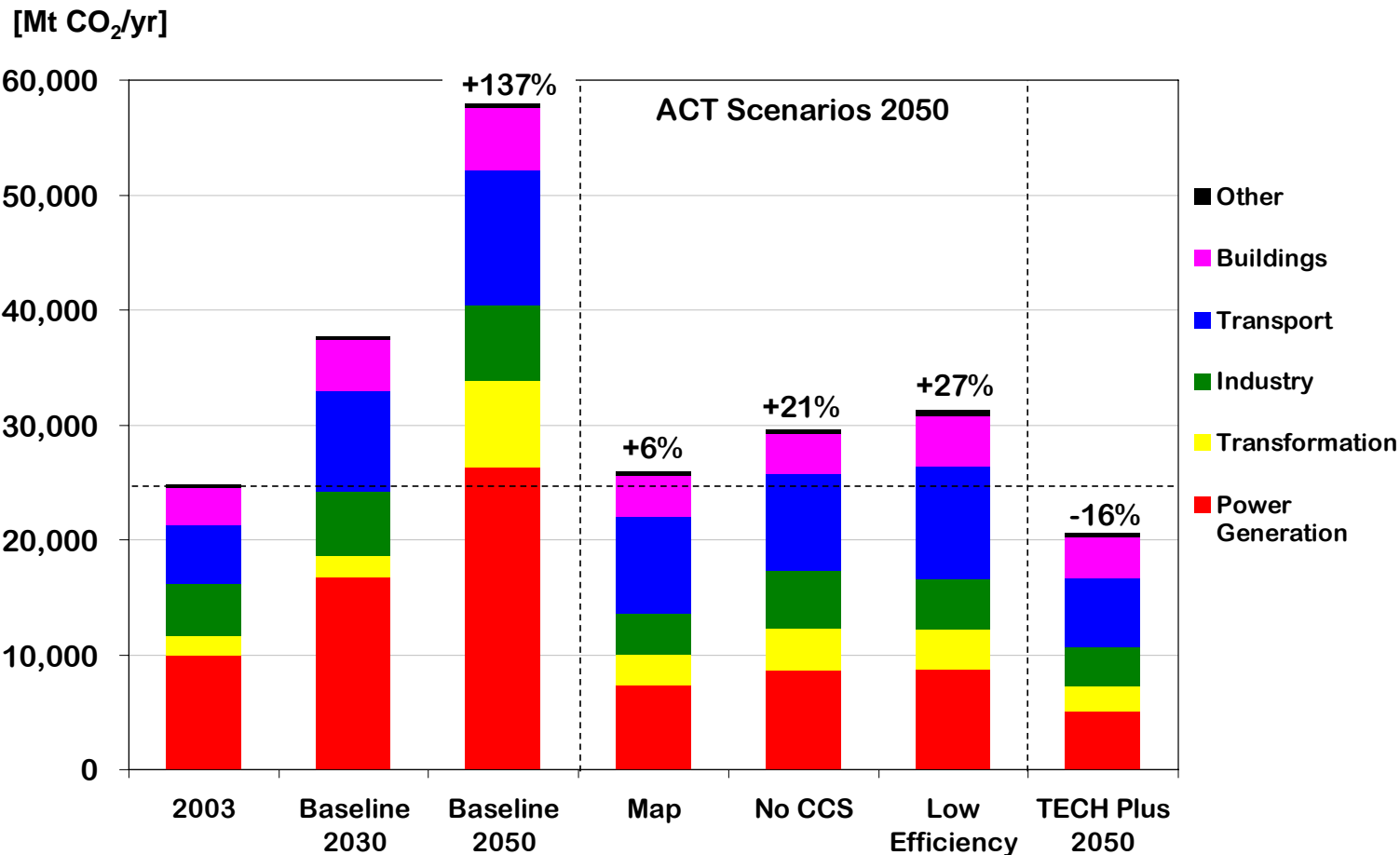
2006

Scenarios & Strategies
to 2050



Global CO₂ emissions 2003-2050

Baseline, ACT and TECH plus scenarios



CO₂ emissions can be returned to current levels through a portfolio of technologies and CO₂ emissions price of \$25/tonne CO₂ from 2030 onwards

ENERGY
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2006

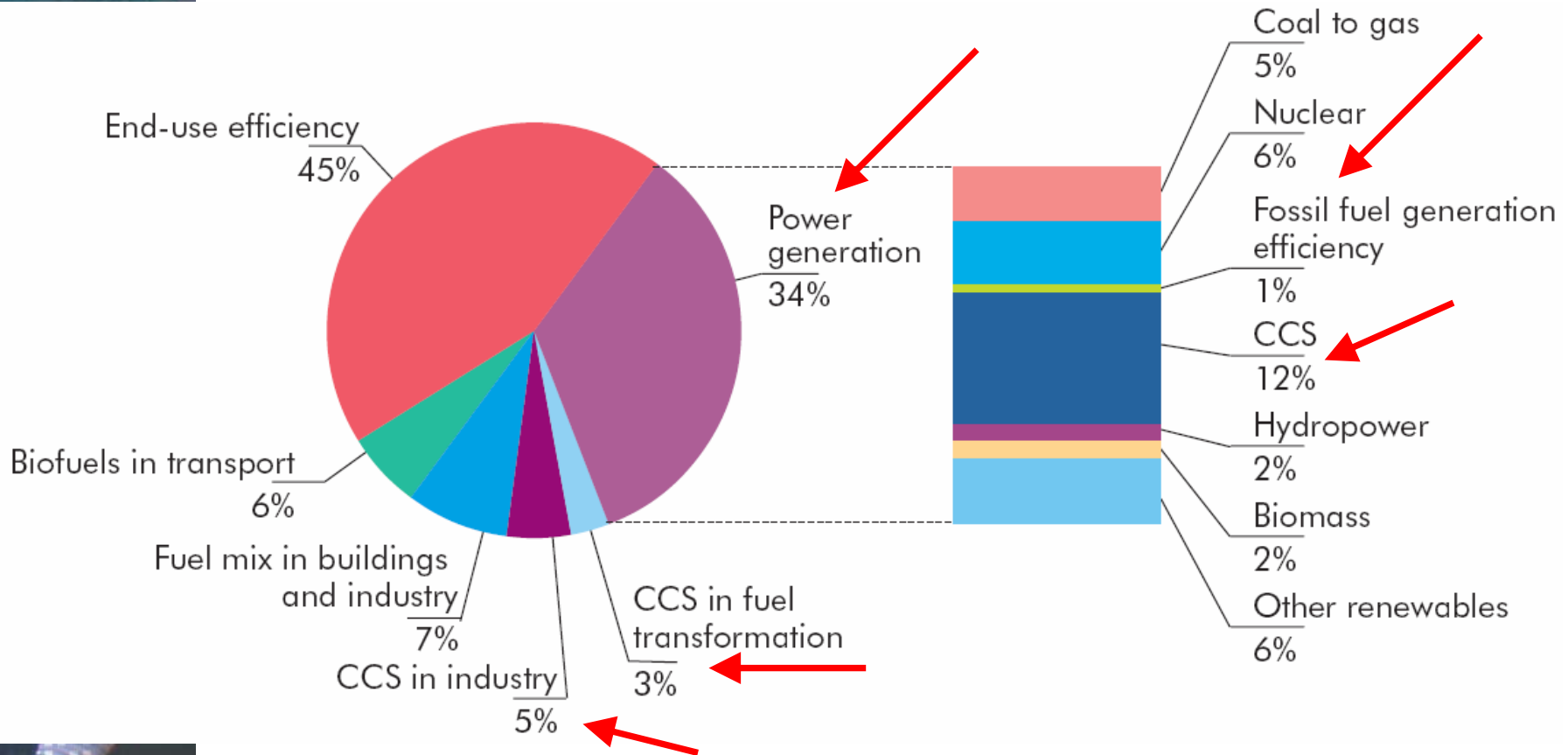
Scenarios & Strategies
to 2050



Accelerated Technology Scenarios (ACT)

- **Contributions to reduction of CO₂ emissions in 2050 compared to baseline scenario**
 - **31-53% Energy efficiency**
 - **20-28% CO₂ capture and storage (CCS)**
 - **11-16% Fuel switch**
 - **5-16% Renewable energies (electricity)**
 - **2-10% Nuclear power**
 - **~6% Bio fuels**
 - **1 – 3% Other technologies**

Role of CCS in Mitigating CO₂ Emissions (Map Scenario)



CCS in all scenarios 20 – 28% emissions reduction compared to Basis scenario



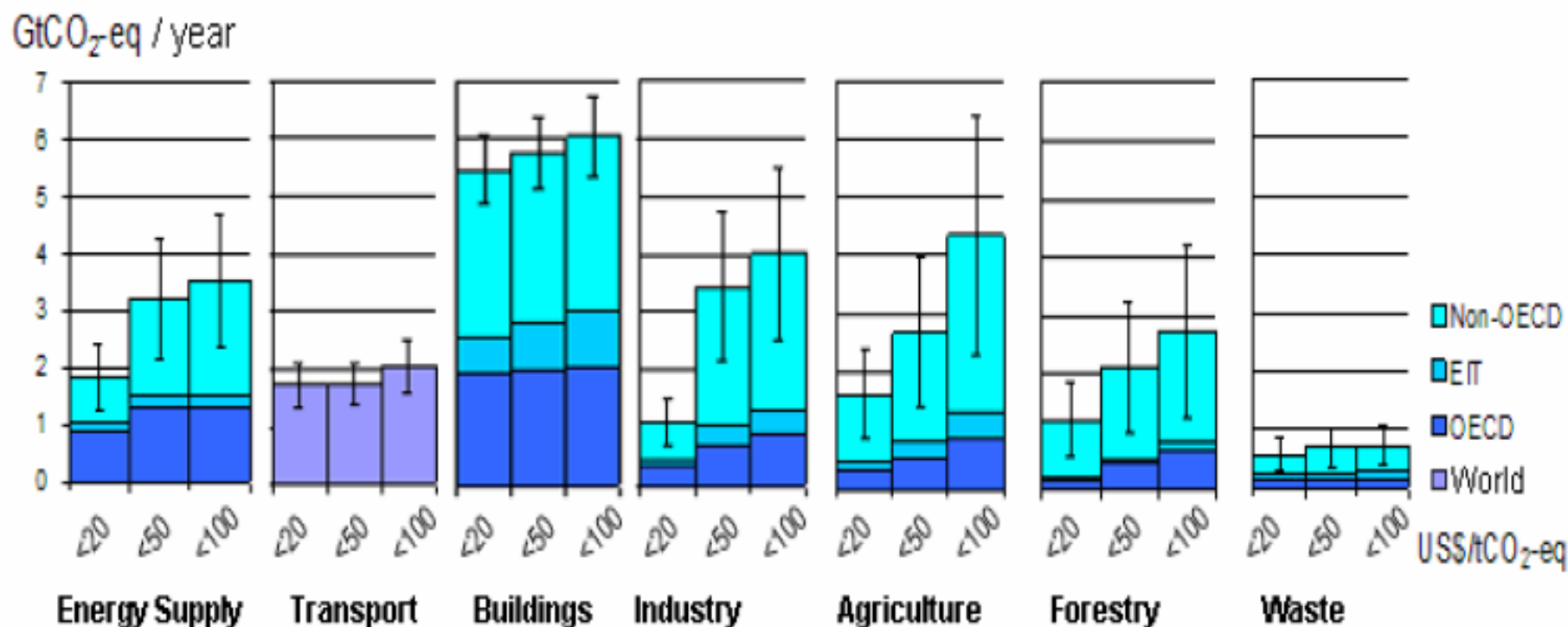


What the most recent 4th IPCC assessment report says about power production

Launched 4 May 2007

For those who have not had a chance yet to study it ...

All sectors and regions have the potential to contribute



Note: estimates do not include non-technical options, such as lifestyle changes.

How can emissions be reduced?

Sector	(Selected) Key mitigation technologies and practices currently commercially available.
Energy Supply	efficiency; fuel switching; nuclear power; renewable (hydropower, solar, wind, geothermal and bioenergy); combined heat and power; early applications of CO2 Capture and Storage
Transport	More fuel efficient vehicles; hybrid vehicles; biofuels; modal shifts from road transport to rail and public transport systems; cycling, walking; land-use planning
Buildings	Efficient lighting; efficient appliances and airco; improved insulation ; solar heating and cooling; alternatives for fluorinated gases in insulation and appliances

What are the macro-economic costs in 2030?

Stabilization levels (ppm CO ₂ -eq)	Median GDP reduction ^[1] (%)	Range of GDP reduction ^[2] (%)	Reduction of average annual GDP growth rates ^[3] (percentage points)
590-710	0.2	-0.6 – 1.2	< 0.06
535-590	0.6	0.2 – 2.5	<0.1
445-535 ^[4]	Not available	< 3	< 0.12

^[1] This is global GDP based market exchange rates.

^[2] The median and the 10th and 90th percentile range of the analyzed data are given.

^[3] The calculation of the reduction of the annual growth rate is based on the average reduction during the period till 2030 that would result in the indicated GDP decrease in 2030.

^[4] The number of studies that report GDP results is relatively small and they generally use low baselines.

What are the macro-economic costs in 2050?

Stabilization levels (ppm CO ₂ -eq)	Median GDP reduction [1] (%)	Range of GDP reduction [2] (%)	Reduction of average annual GDP growth rates [3] (percentage points)
590-710	0.5	-1 – 2	< 0.05
535-590	1.3	Slightly negative - 4	<0.1
445-535 [4]	Not available	< 5.5	< 0.12

[1] This is global GDP based market exchange rates.

[2] The median and the 10th and 90th percentile range of the analyzed data are given.

[3] The calculation of the reduction of the annual growth rate is based on the average reduction during the period till 2050 that would result in the indicated GDP decrease in 2050.

[4] The number of studies that report GDP results is relatively small and they generally use low baselines.

The importance of a “price of carbon”

- Policies that provide a real or implicit price of carbon could create incentives for producers and consumers to significantly invest in low-GHG products, technologies and processes.
- Such policies could include economic instruments, government funding and regulation
- For stabilisation at around 550 ppm CO₂eq carbon prices should reach 20-80 US\$/tCO₂eq by 2030 (5-65 if “induced technological change” happens)
- At these carbon prices large shifts of investments into low carbon technologies can be expected



G8 - Gleneagles Communiqué July 2005



“We will act with resolve and urgency to meet our shared multiple objectives of reducing greenhouse gas emissions, improving the global environment, enhancing energy security and cutting air pollution in conjunction with our vigorous efforts to reduce poverty“



General Itinerary of the Gleneagles G8 Plan of Action

- **Interim reports to G8 summits**
 - ◆ 2006 Russia
 - ◆ 2007 Germany
- **Final reports and recommendations will be submitted to the 2008 G8-summit in Japan**
- **G8 session on 2nd conference day:**
 - ◆ First results and preliminary analysis
 - ◆ IEA will present possible recommendations
 - ◆ Comments and discussion welcome