International Gas Union

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The Climate Change Challenge and the Role of the Natural Gas

Ernesto López Anadón
President of IGU

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Challenges related to the energy supply

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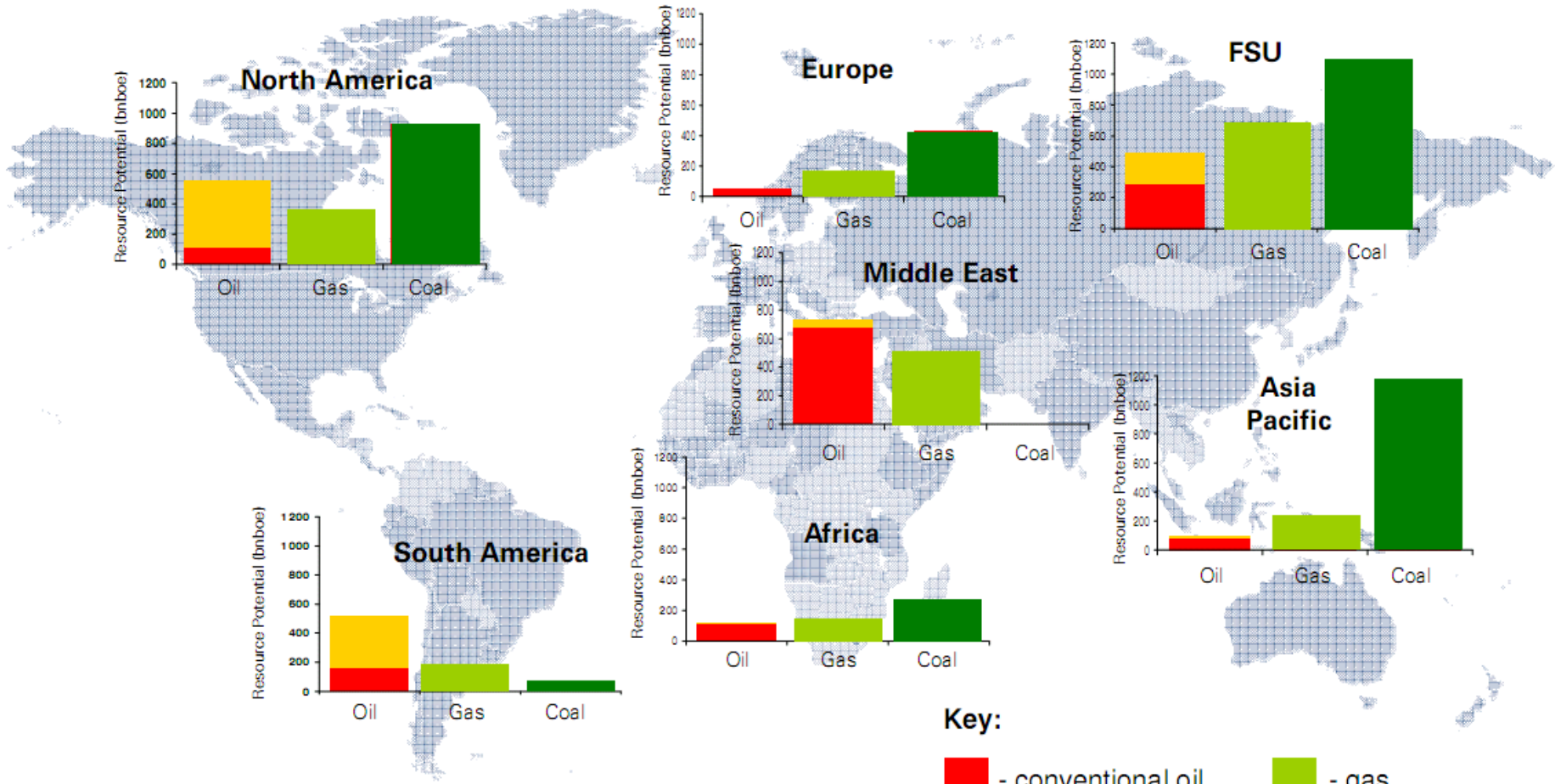
- How to supply in sustainable manner energy to the growing world population and the also growing industrial activity?
- How to curb the increasing GHG emissions in spite of the growing population and industrial activity?
- How to accomplish that with the present dependency on fossil fuels and the concentration of reserves in a few countries?
- How to develop these reserves in a timely manner with the present uncertainty of energy policies in the few consuming countries where demand is concentrated?
- How can the participation of renewables be increased in the primary energy matrix?

HC and C Reserves

Oil, Gas and Coal Resources by Region (bnboe)



Source: BP Data

Oil Proved Reserves

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Proved reserves at end 2007
Thousand million barrels

Source: BP Statistical Review of World Energy June 2008

Coal Proved Reserves

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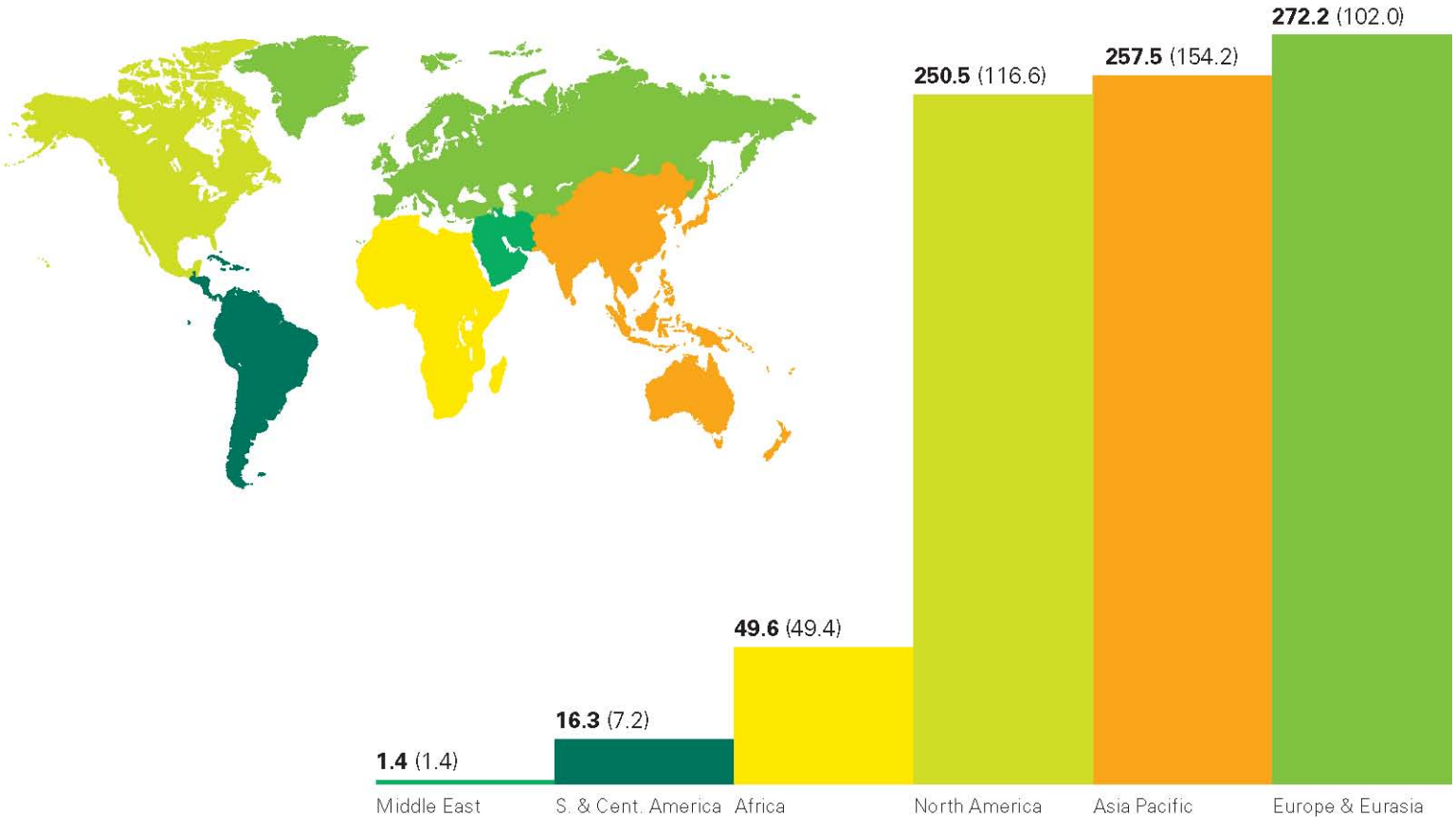
Proved reserves at end 2007
Thousand million tonnes (anthracite and bituminous coal shown in brackets)



Source: BP Statistical Review of World Energy June 2008

Natural Gas Proved reserves

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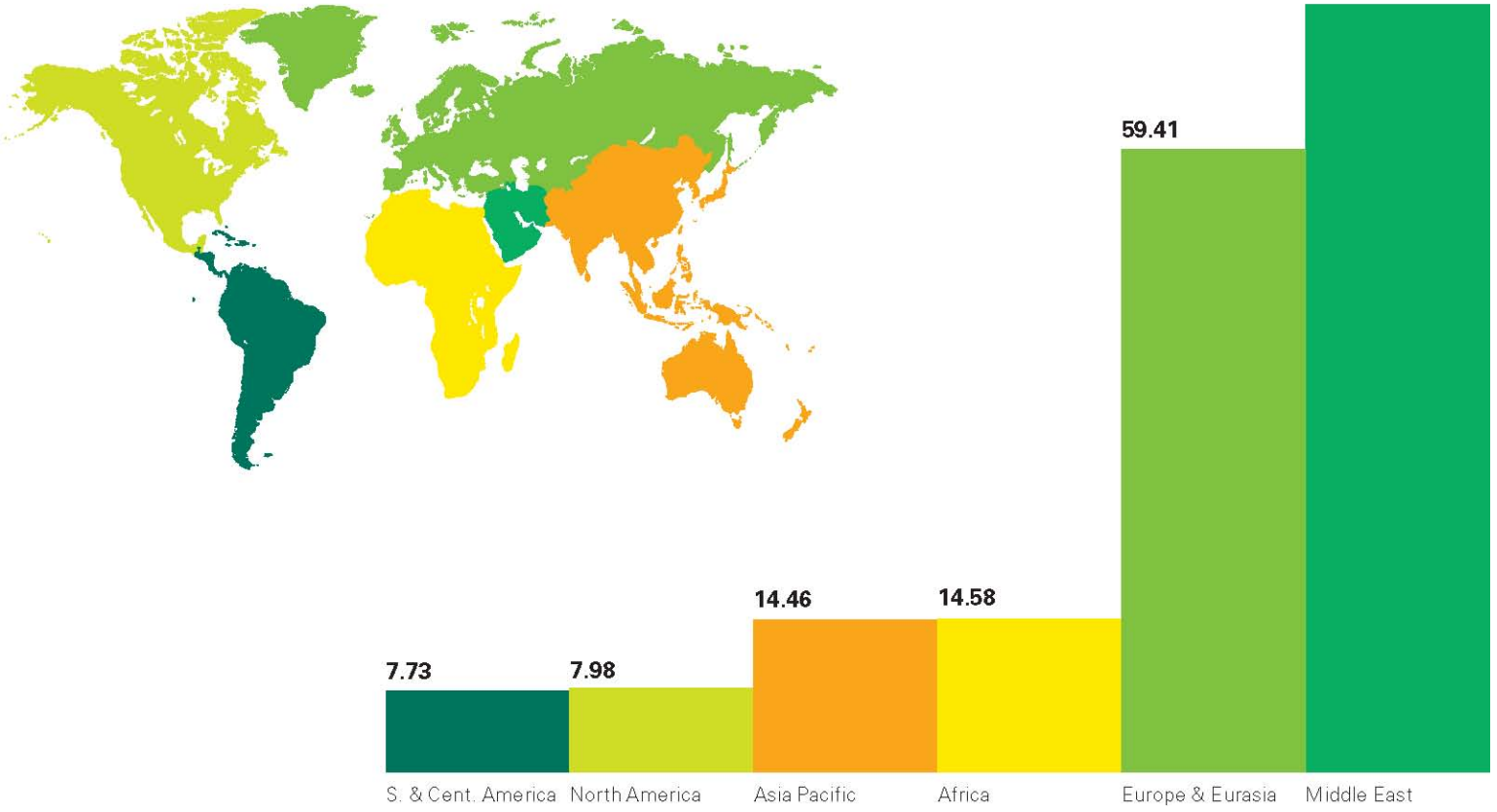
Proved reserves at end 2007
Trillion cubic metres



Source: BP Statistical Review of World Energy June 2008

World Primary Energy Demand in the Reference Scenario

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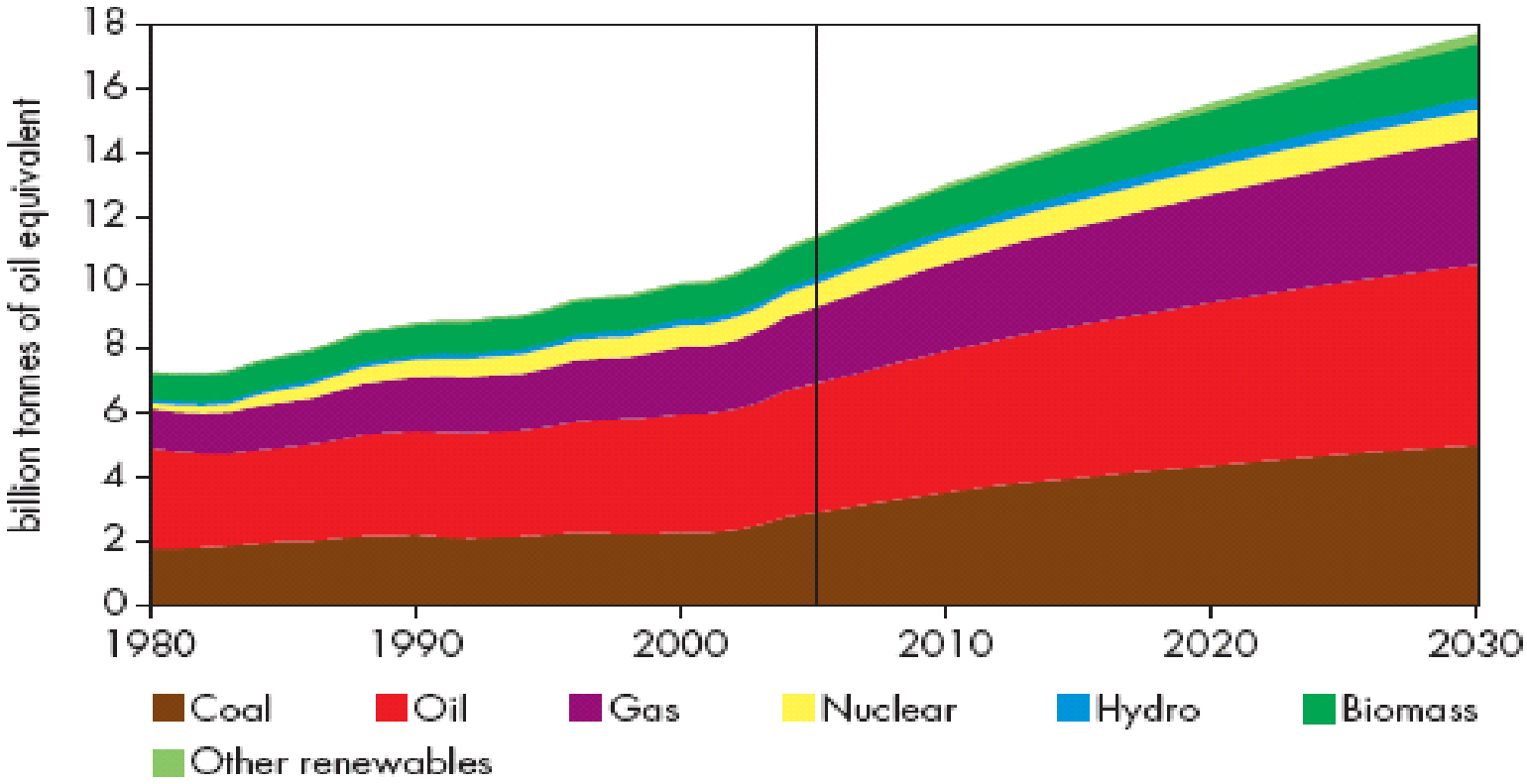

Source: IEA World Energy Outlook 2007

Risk of global underinvestment in the gas sector to 2015

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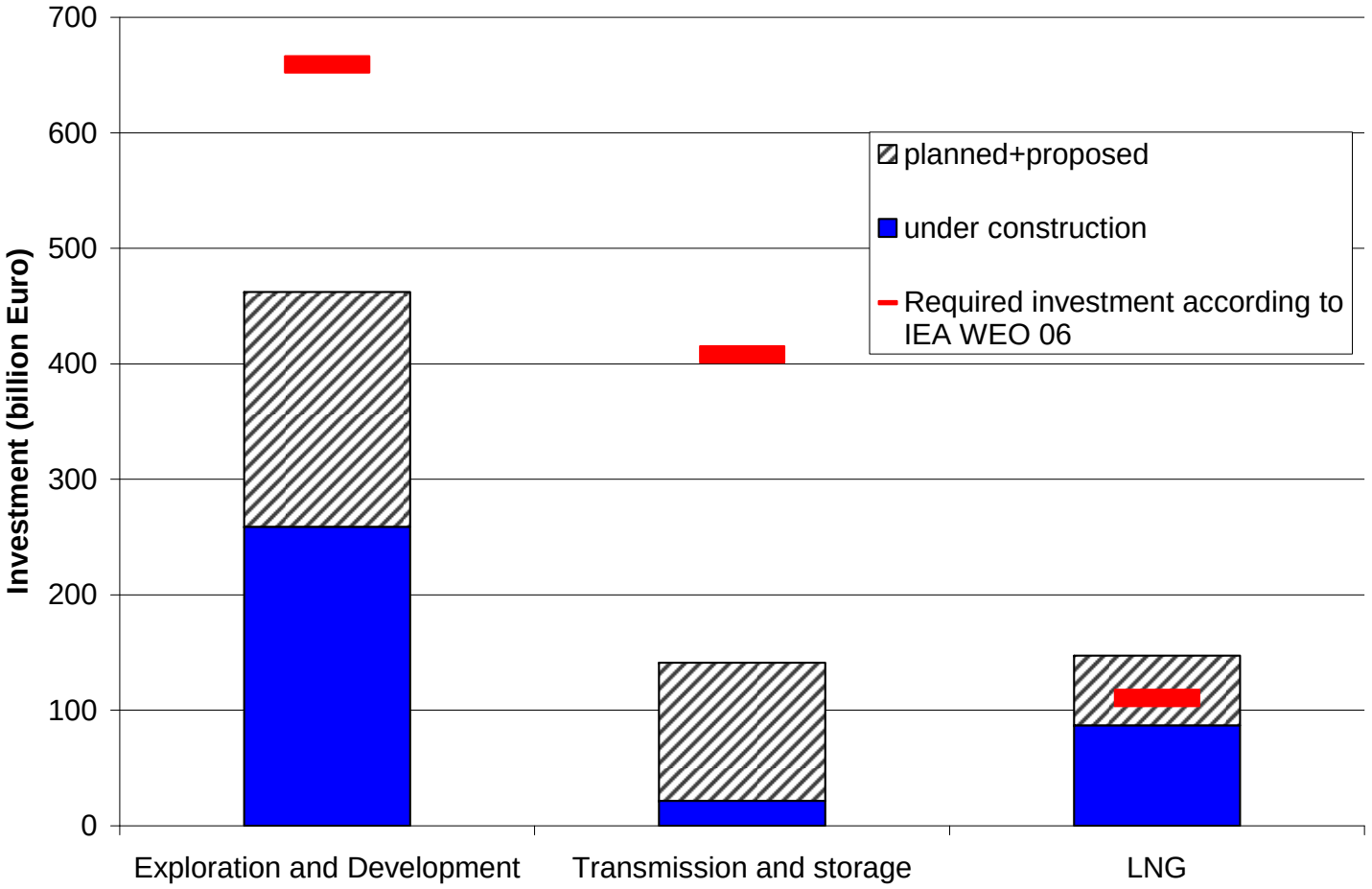

Source: IEA, Market Review Natural Gas 2007

Tendency of resource nationalism

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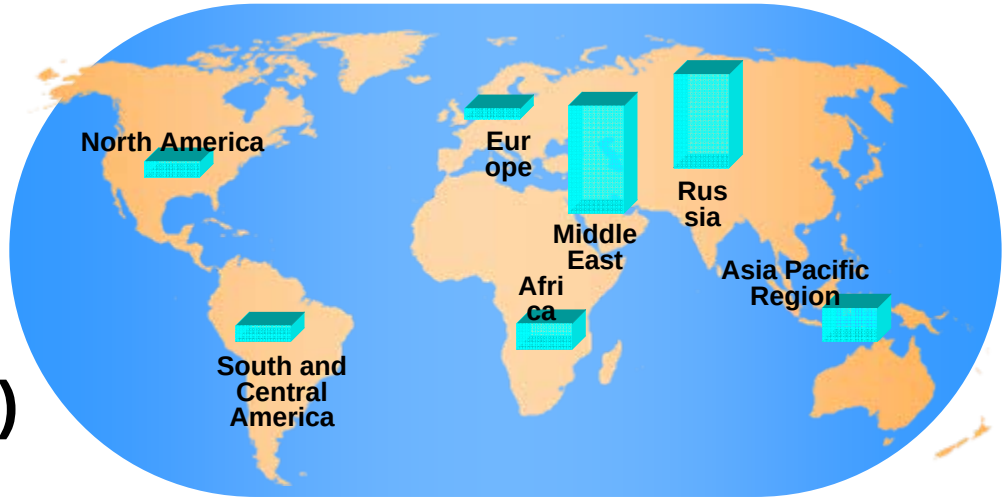
- NOCs hold majority of gas reserves
- Concentrated on few hands, Saudi Arabia, Iran, Russia, Qatar, Venezuela)



Source: Source: BP Statistical review 2006, Figures from 2005

- IOCs control only 6% world reserves

Regional Energy Demand

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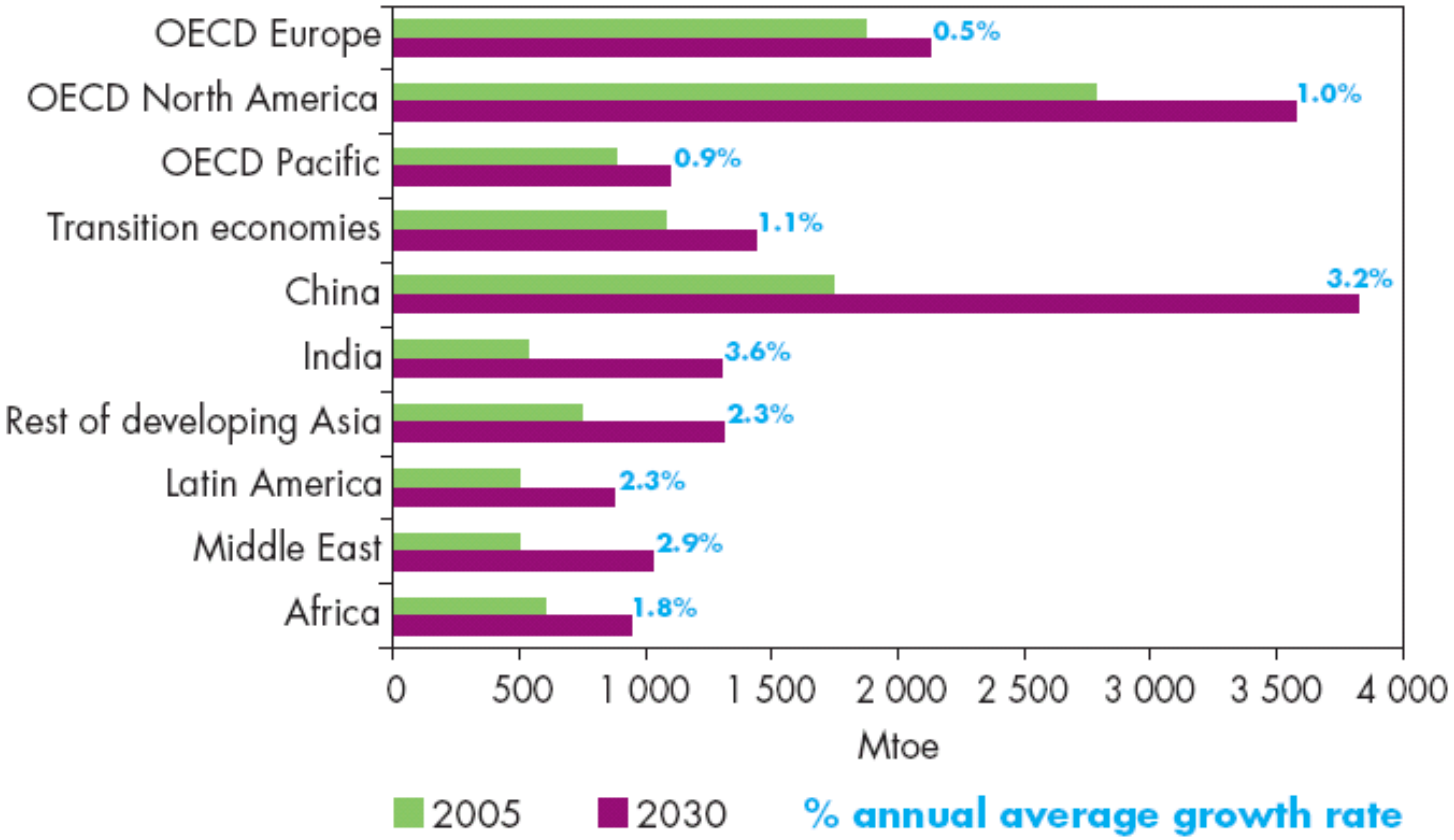
Figure 1.3: **Primary Energy Demand by Region in the Reference Scenario**



Source: IEA, World Energy Outlook 2007

Global Energy Demand Growth

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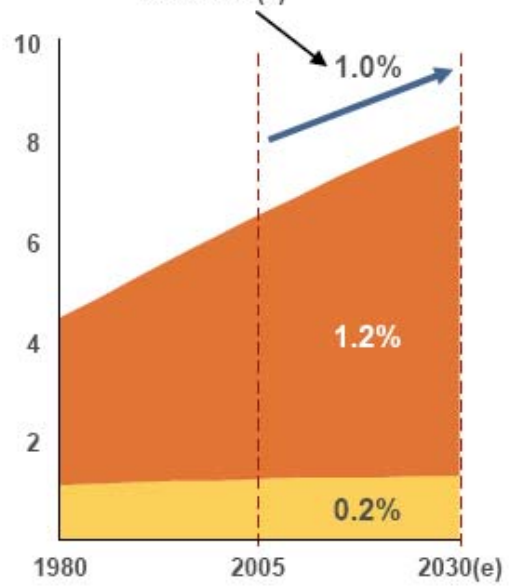
Population

Billion

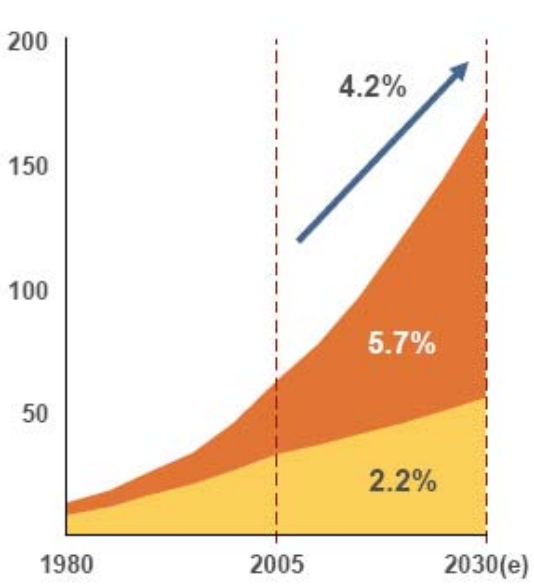
Average annual growth rate, 2005-2030(e)



GDP

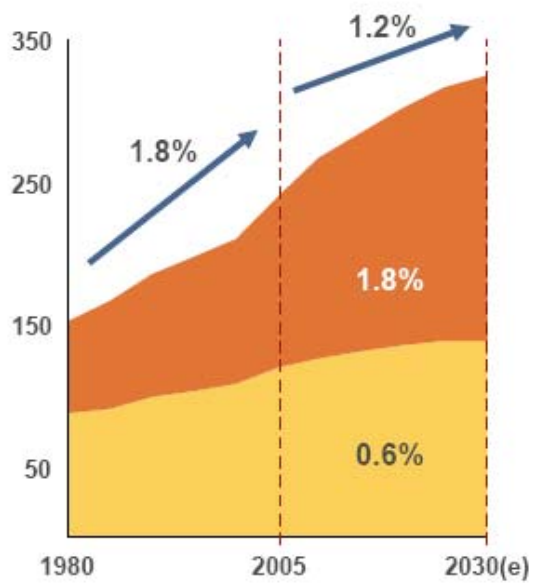
(purchasing power parity)

$ Trillion ($2005)



Energy demand

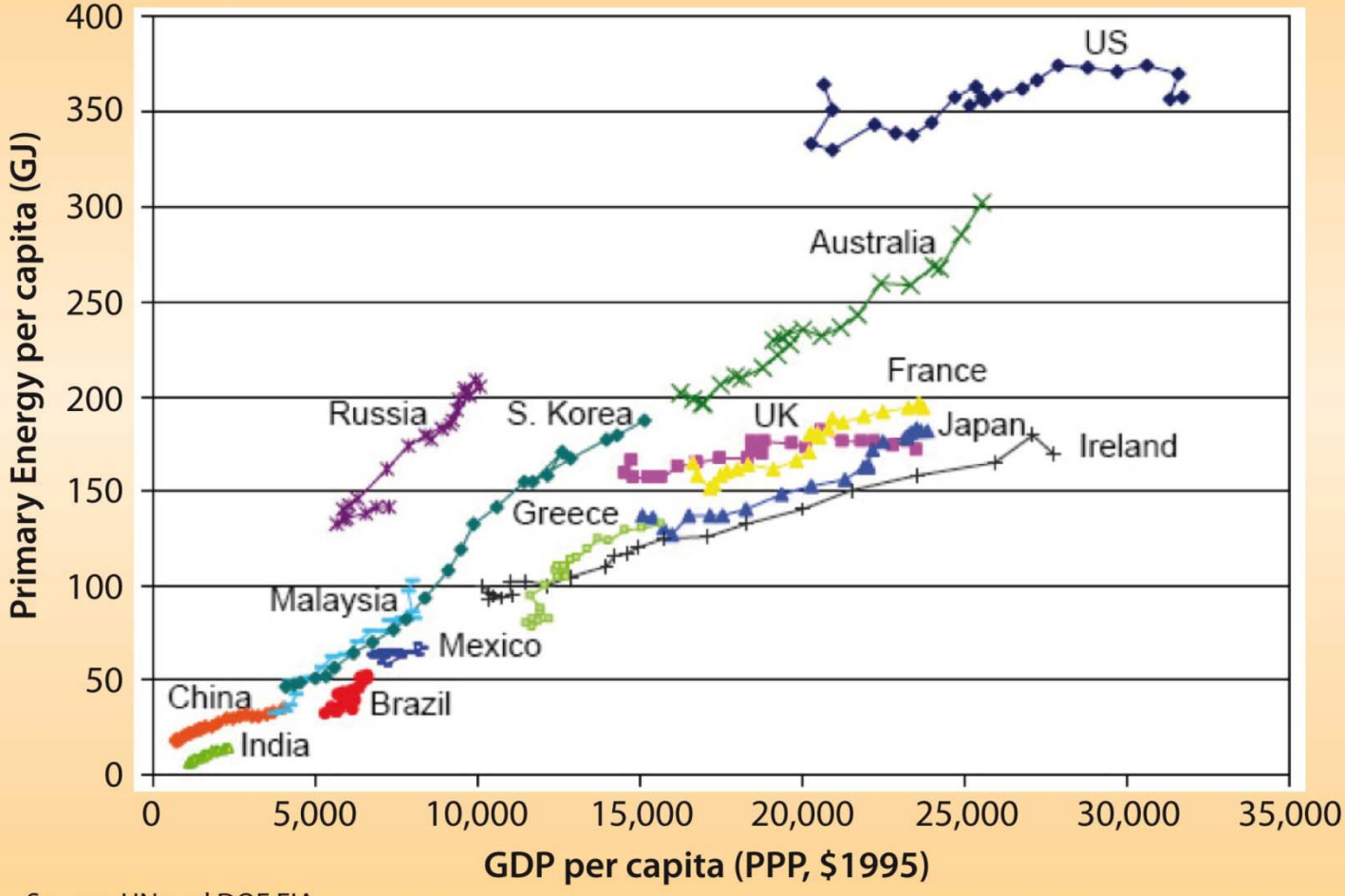
Mboe/d



OECD *Non-OECD*

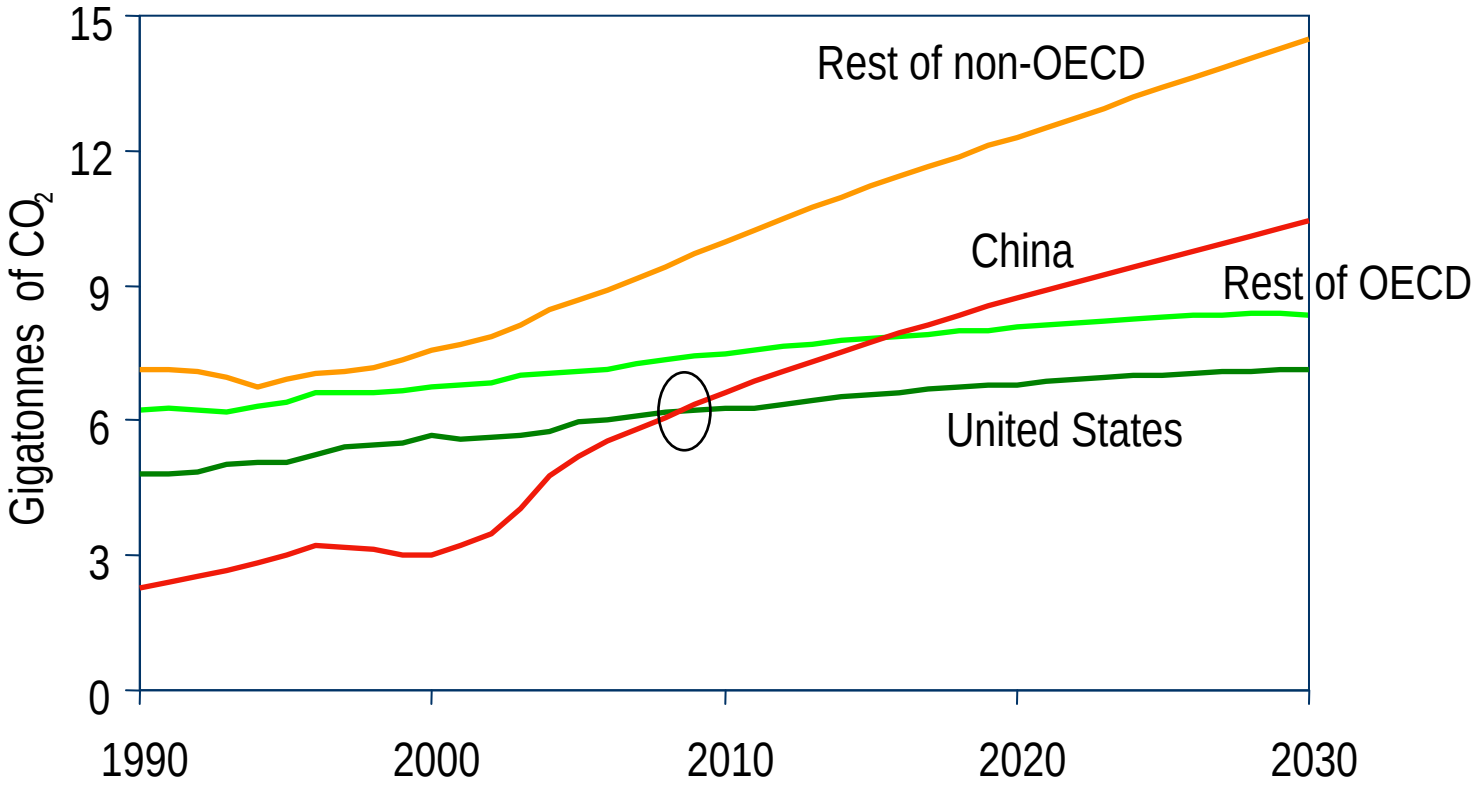
Total (2008)

Energy Demand (1980-2002)



Source: UN and DOE EIA

Energy related CO_2 emissions by region - China growing



Source: OECD/IEA - 2007

Future Scenario

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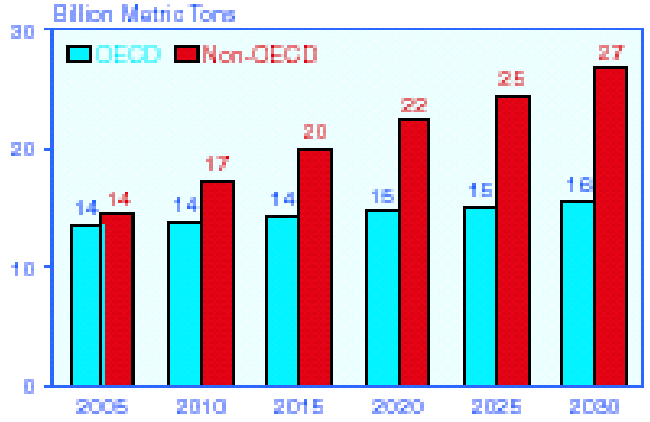
Release Date: September 2008

Next Release Date: May 2009

Figure 75. World Energy-Related Carbon Dioxide Emissions, 2005-2030



Sources: 2005: Energy Information Administration (EIA), *International Energy Annual 2005* (June-October 2007), web site www.eia.doe.gov/iea. Projections: EIA, World Energy Projections Plus (2008).

	OECD	Non-OECD
2005	13,6	14,5
2010	13,8	17,3
2015	14,4	20,0
2020	14,7	22,3
2025	15,1	24,5
2030	15,5	26,8

Source: EIA International Energy Outlook 2008

Baseline Scenario

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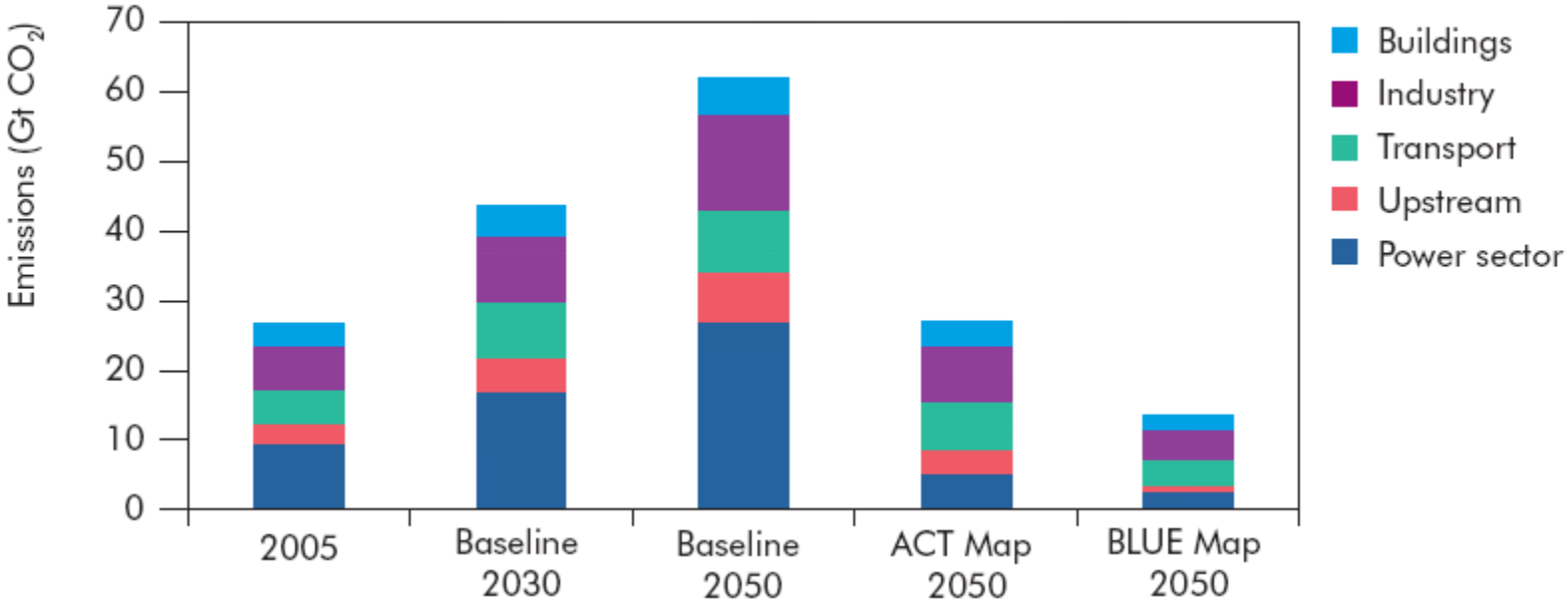
Figure 2.1 ▶ Global CO_2 emissions in the Baseline, ACT Map and BLUE Map scenarios



Source: IEA Energy Technology Perspectives 2008

Greenhouse gases

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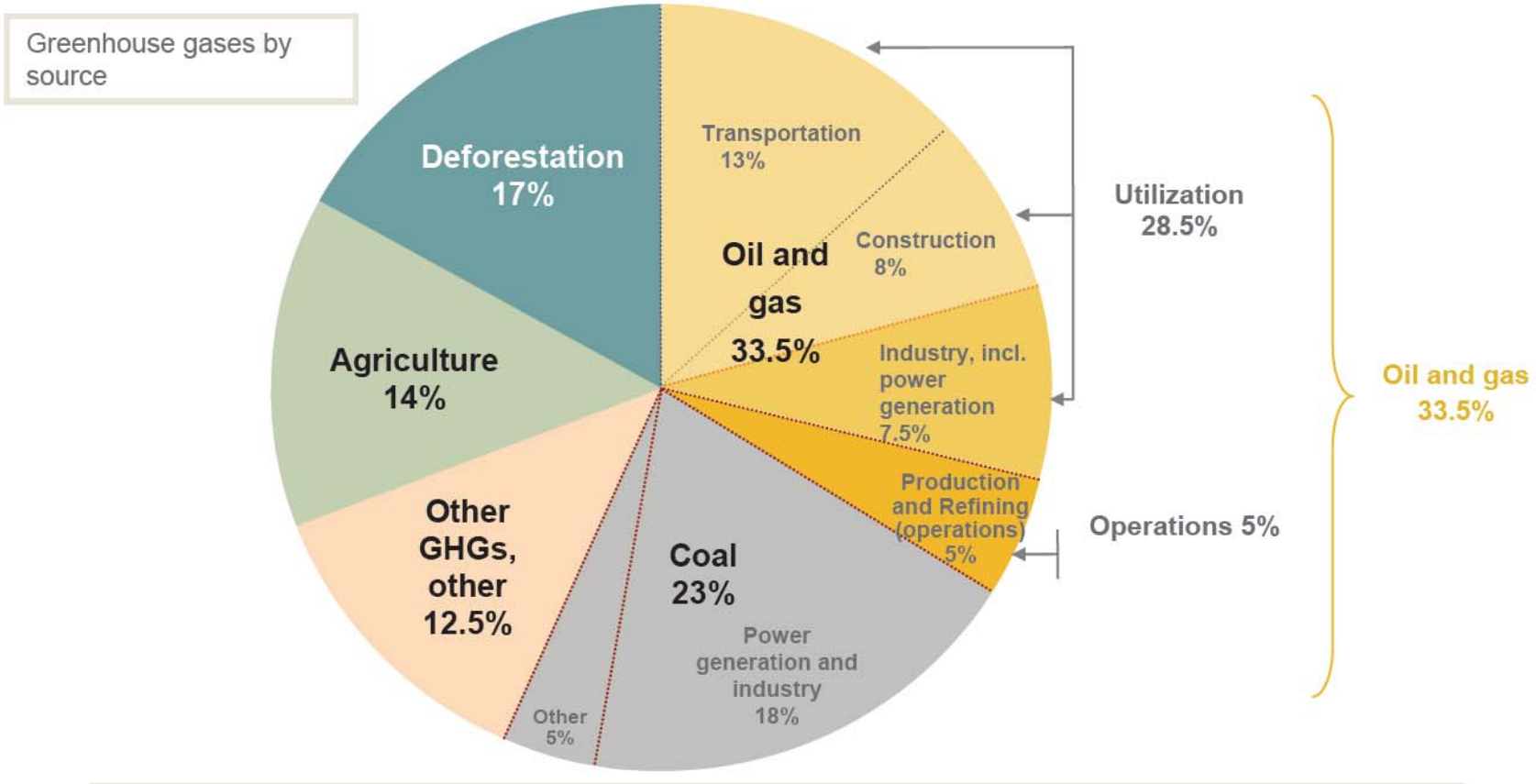

Total (2008)

Scenario

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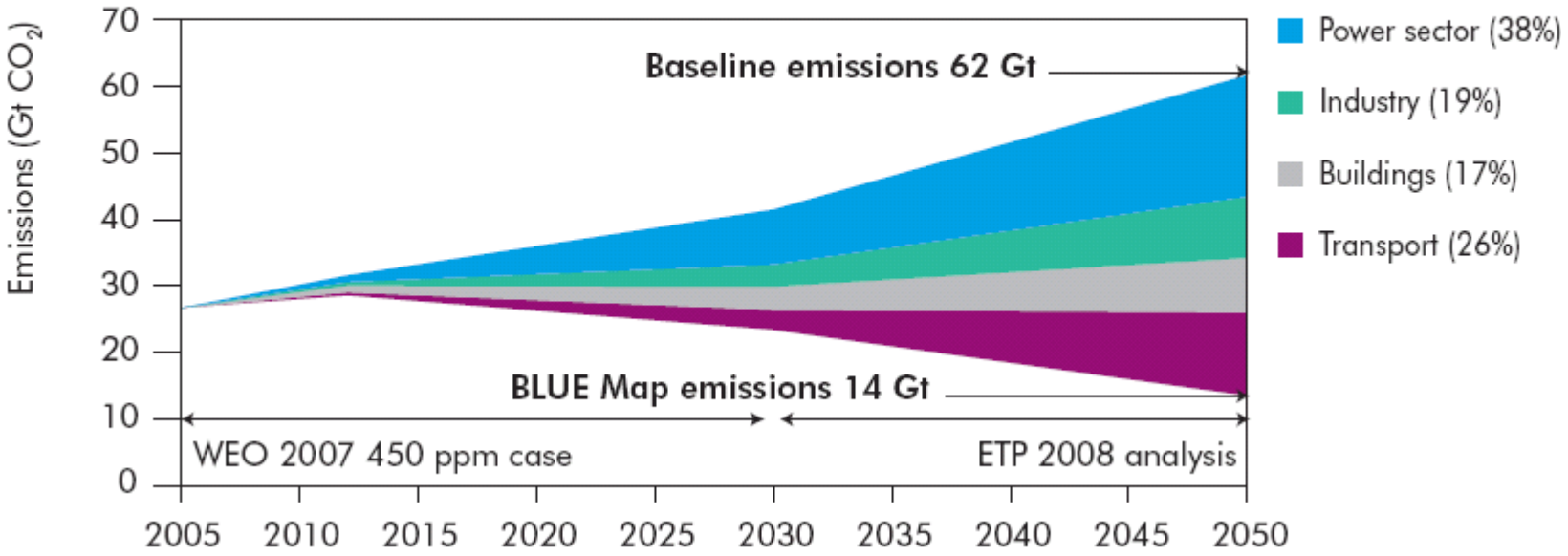
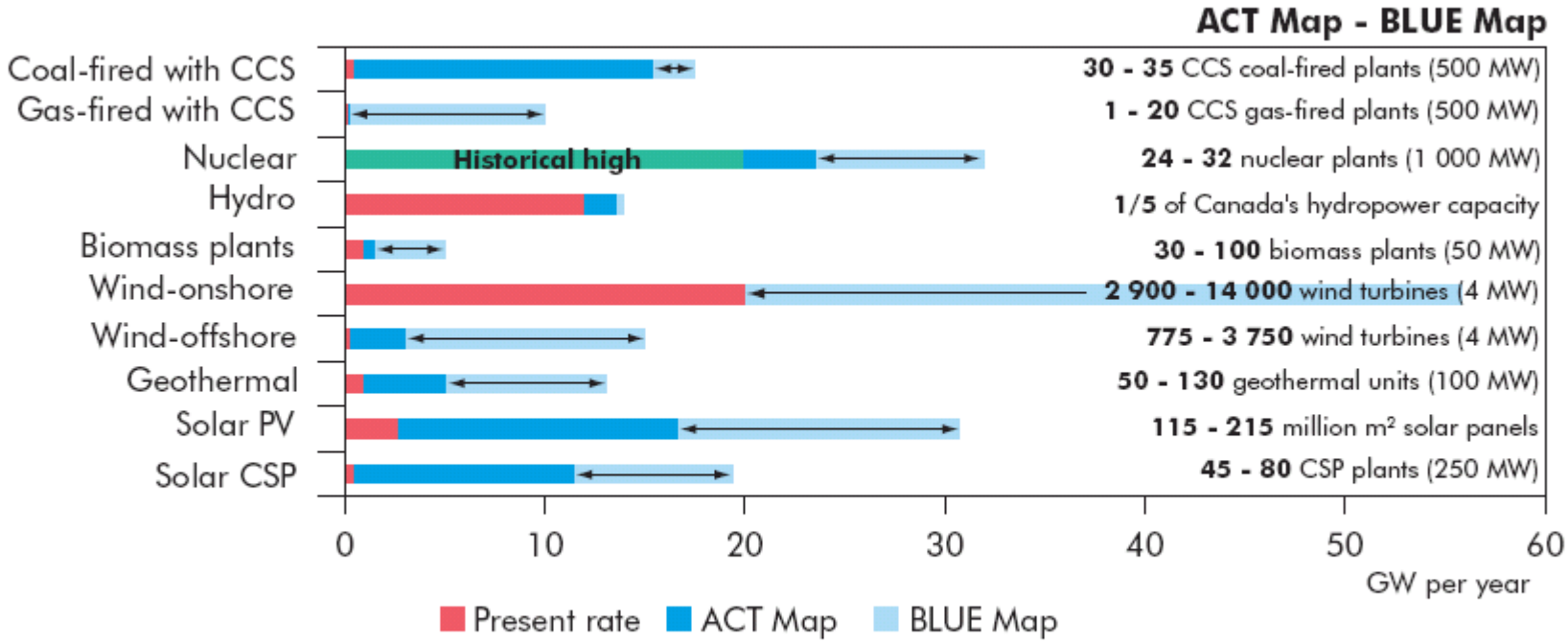
Figure 2.3 ▶ Reduction of energy-related CO_2 emissions from the Baseline scenario in the BLUE Map scenario by sector, 2005-2050



Source: IEA Energy Technology Perspectives 2008

Investment's Scenario

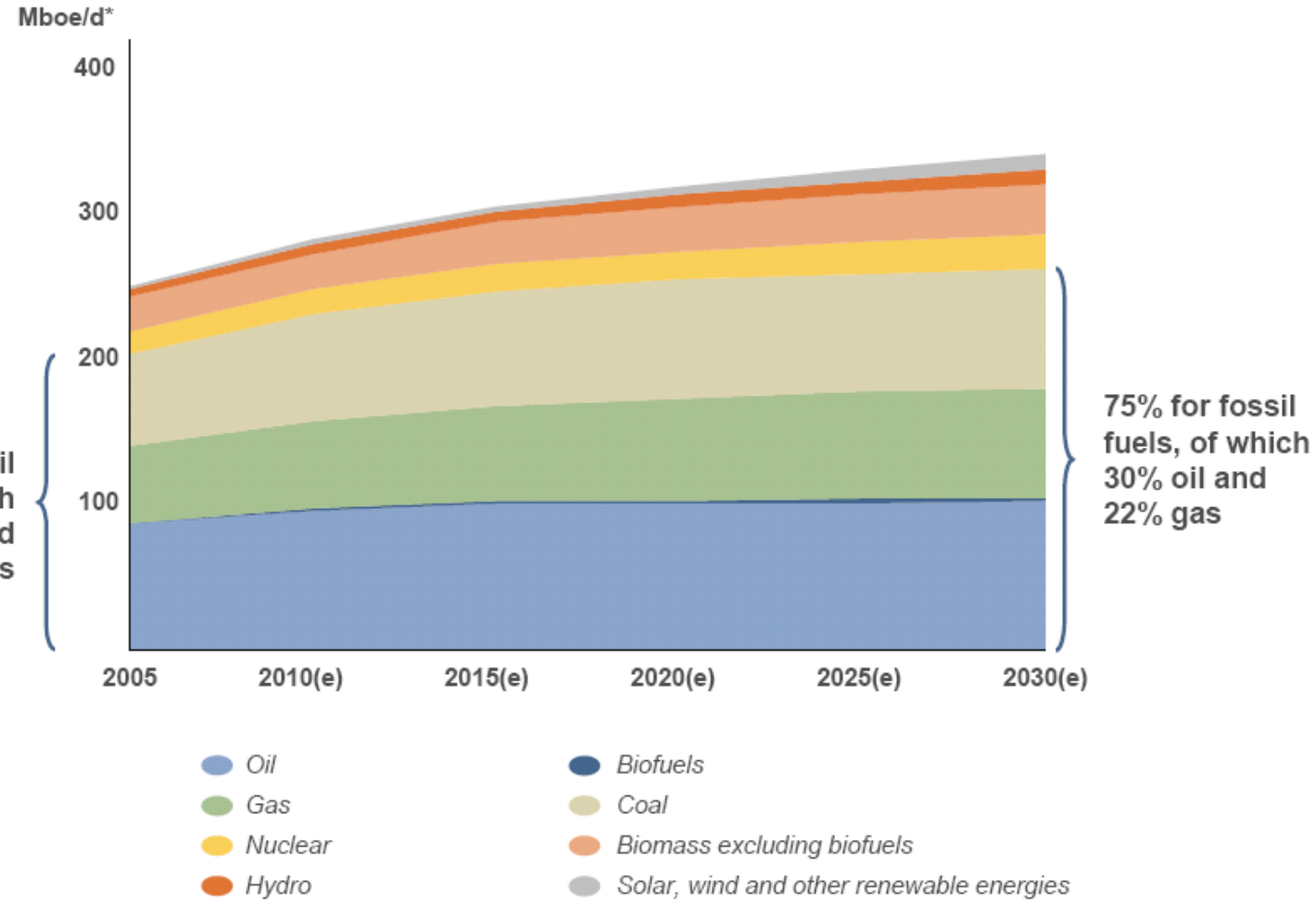
Figure 6.7 ▶ Average annual power plant investment in the ACT Map and BLUE Map scenarios, 2010-2050



Note: Chapter 2 outlines a number of scenarios for power generation. In practice, individual countries will have considerable choice in the balance of low-carbon-generation options that they prefer, depending on local circumstances, resource availability etc.

Source: IEA Energy Technology Perspectives 2008

World Energy Supply



Total (2008)

Actions to do

1. **Energy Conservation**
   - People education
   - Reducing consumption
   - Billed for the amount of the emission

2. **Energy Efficiency**
   - Depend on technology

Energy Efficiency

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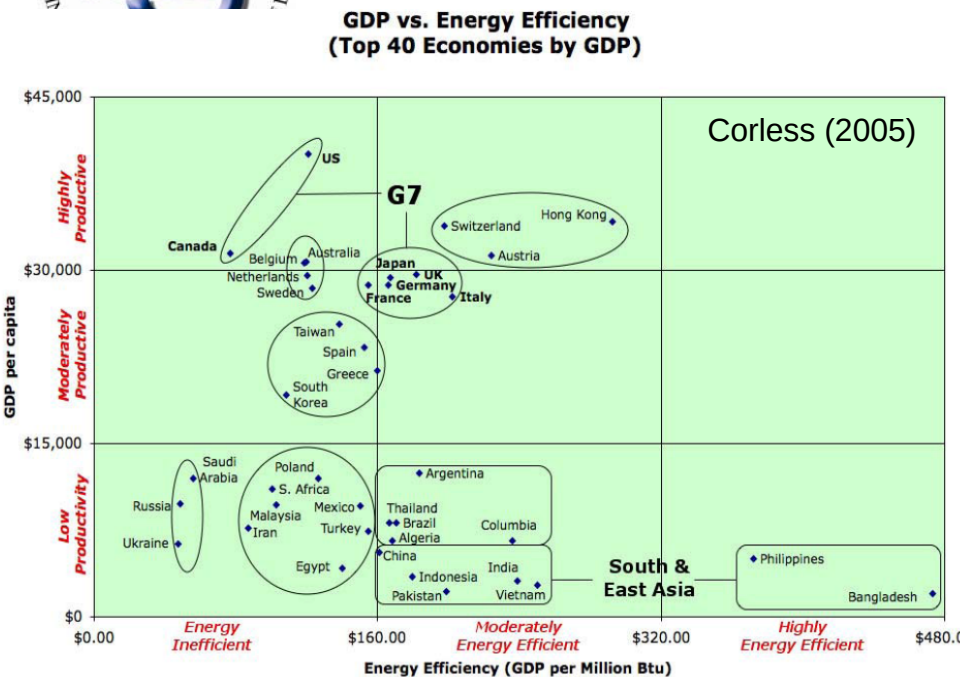
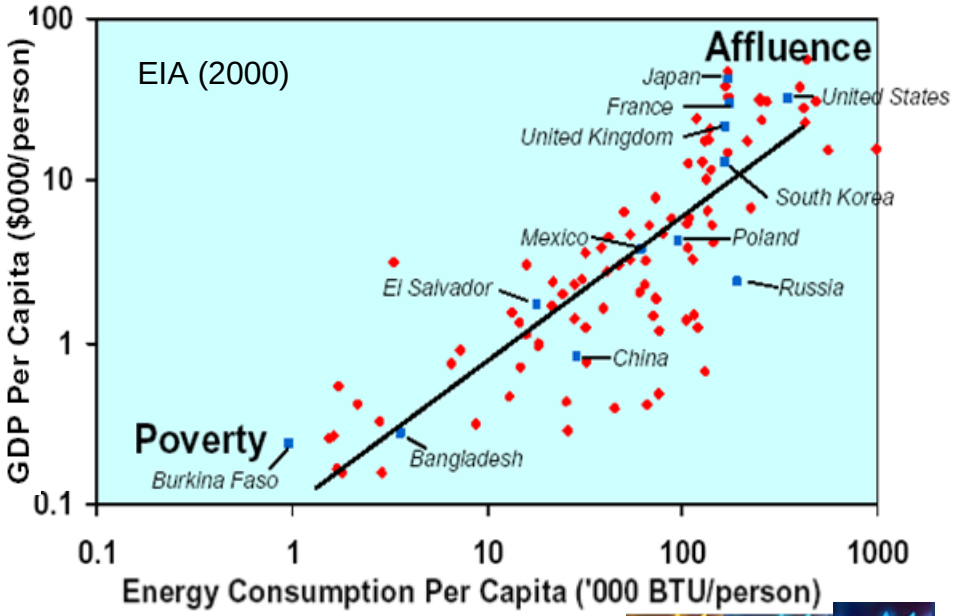
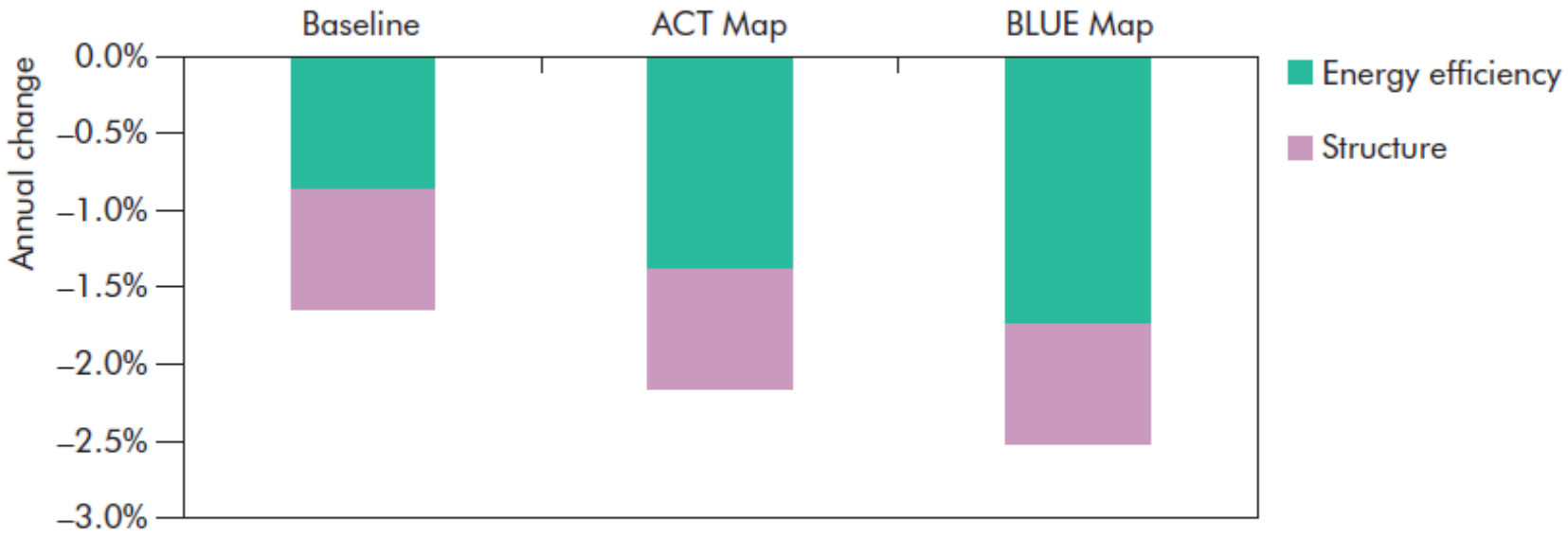




Energy Efficiency

News, Views

Figure 2.10 ▶ Contribution of energy efficiency and structural changes to reductions in final energy intensity under the scenarios



Key point

Increases in the rate of energy efficiency improvement are responsible for the faster reductions in final energy intensity under the ACT Map and BLUE Map scenarios.

Source: IEA Energy Technology Perspectives 2008

Energy Conservation

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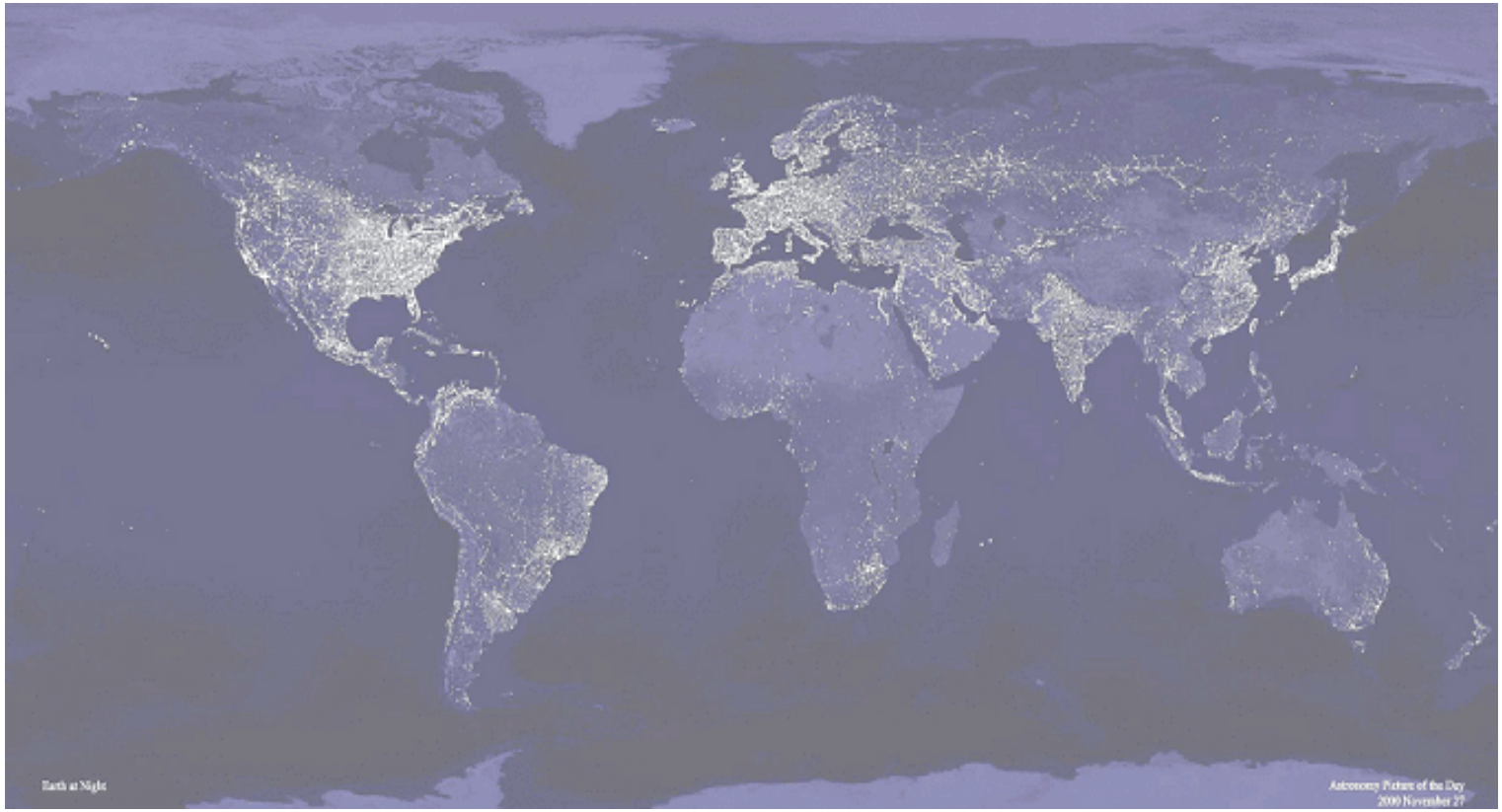

3. Use Natural Gas

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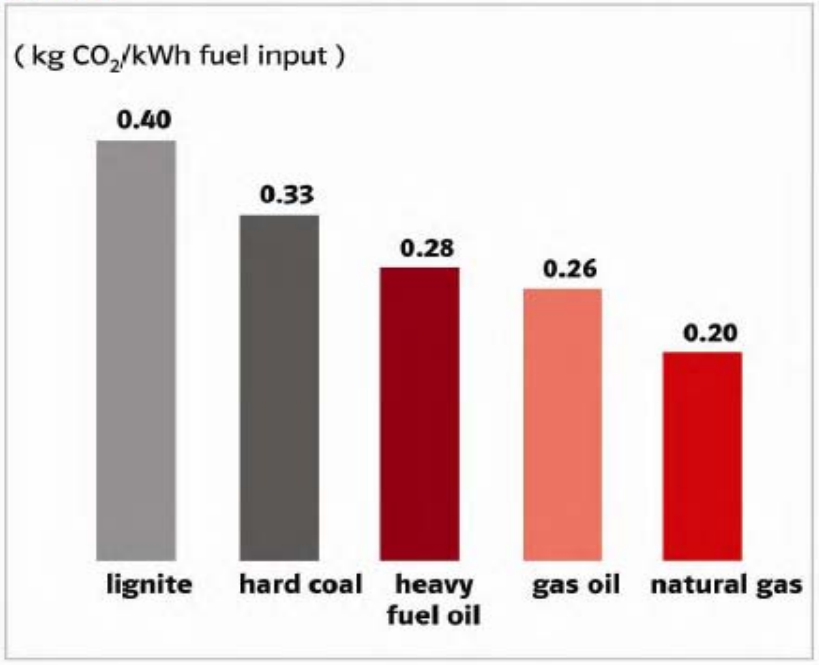
CO_2 formed by the combustion of fossil fuels:



Key facts:

- Fossil fuels will be required to meet the world's energy demand well into the future
- Natural gas is the fossil fuel with the lowest carbon content
- Its extended use in existing and new application areas is a particularly good way of achieving a reduction in CO_2 emissions

Source: E.ON Ruhrgas 2007

Natural Gas – a Success Story

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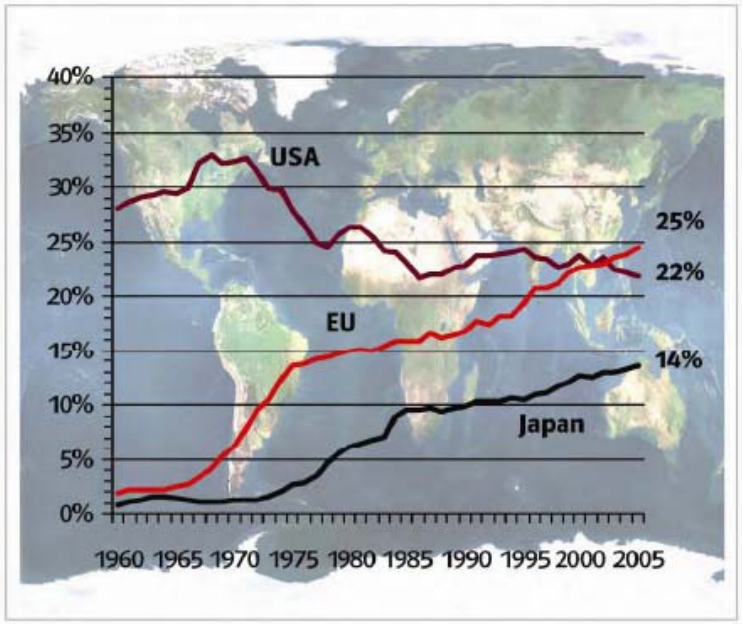
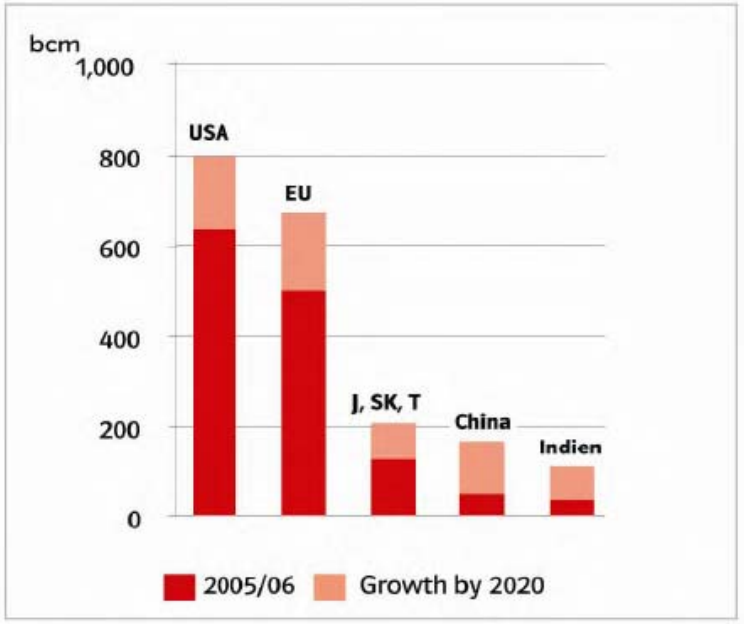
Development of natural gas shares in primary energy consumption:



Gas demand 2005/06 and growth by 2020:



Source: E.ON Ruhrgas, Wood Mackenzie.

CONCLUSION

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If you use energy

- DO IT LESS
- DO IT EFFICIENTLY
- DO IT WITH NATURAL GAS

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Thank you
for your attention!

See you in Buenos Aires!

24rd World Gas Conference and Exhibition

October 5 – 9 2009

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