



INTERNATIONAL ENERGY AGENCY

# **WEO 2004-Alternative Policy Scenario Seeds for a Manifesto?**

**Dr. Fatih Birol  
Chief Economist  
Head, Economic Analysis Division**

*Workshop "Policies to Shape an Alternative Energy Future", IEA, 25 May 2005*



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

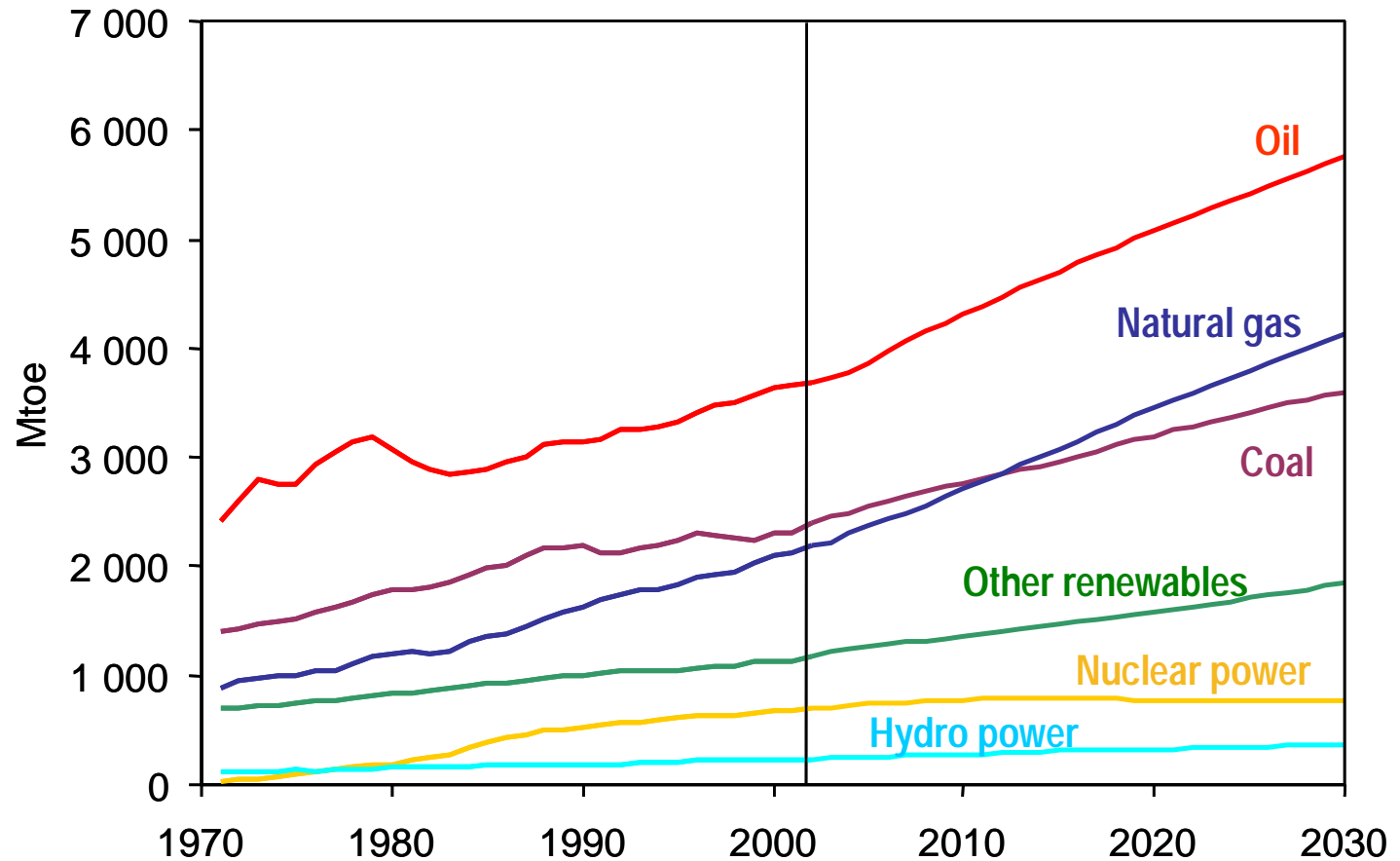
# Energy Trends & Strategic Challenges Reference Scenario



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

# World Primary Energy Demand



**Fossil fuels account for almost 90% of the growth in energy demand between now and 2030**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

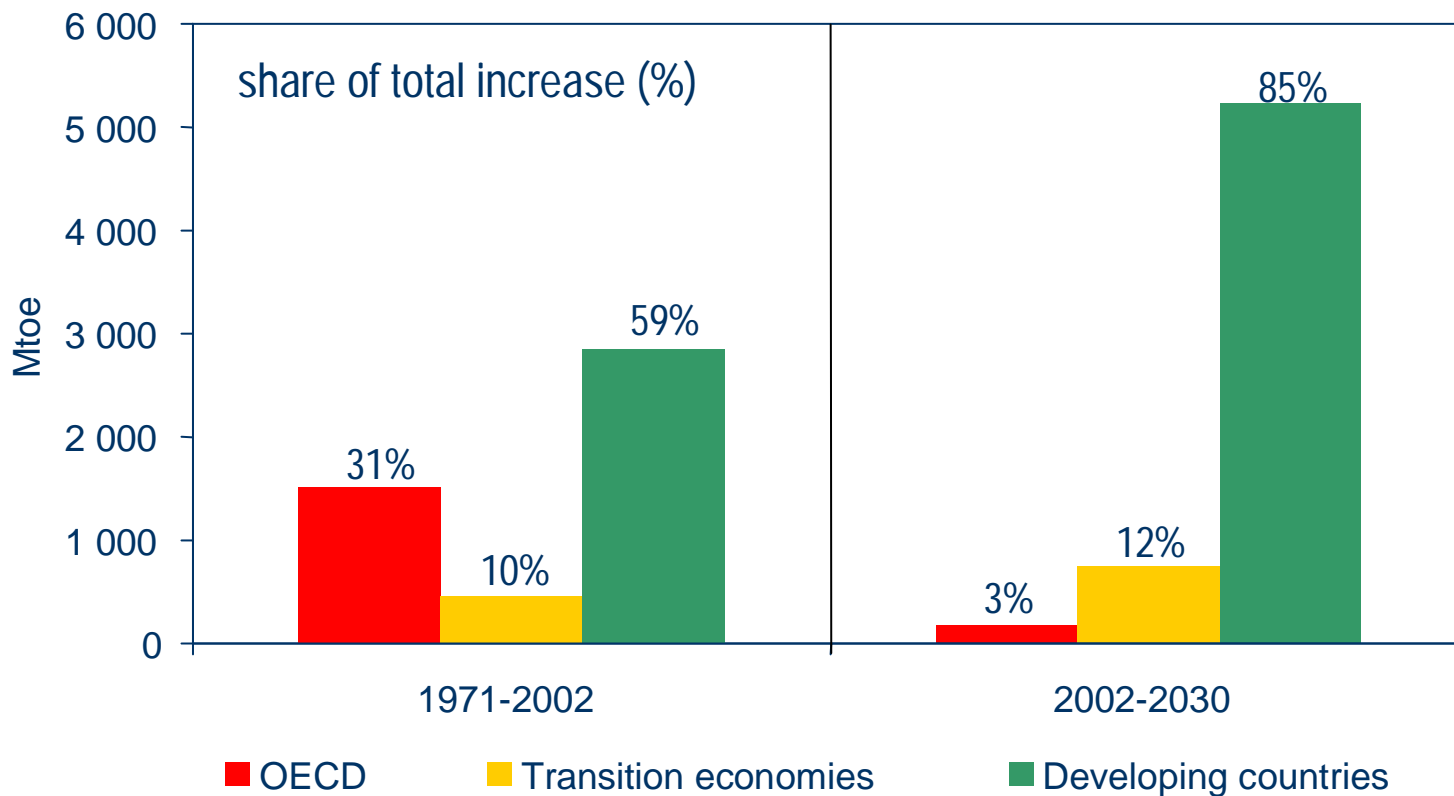
## **Challenge 1: Security of Supply**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

## Increase in World Primary Energy Production by Region



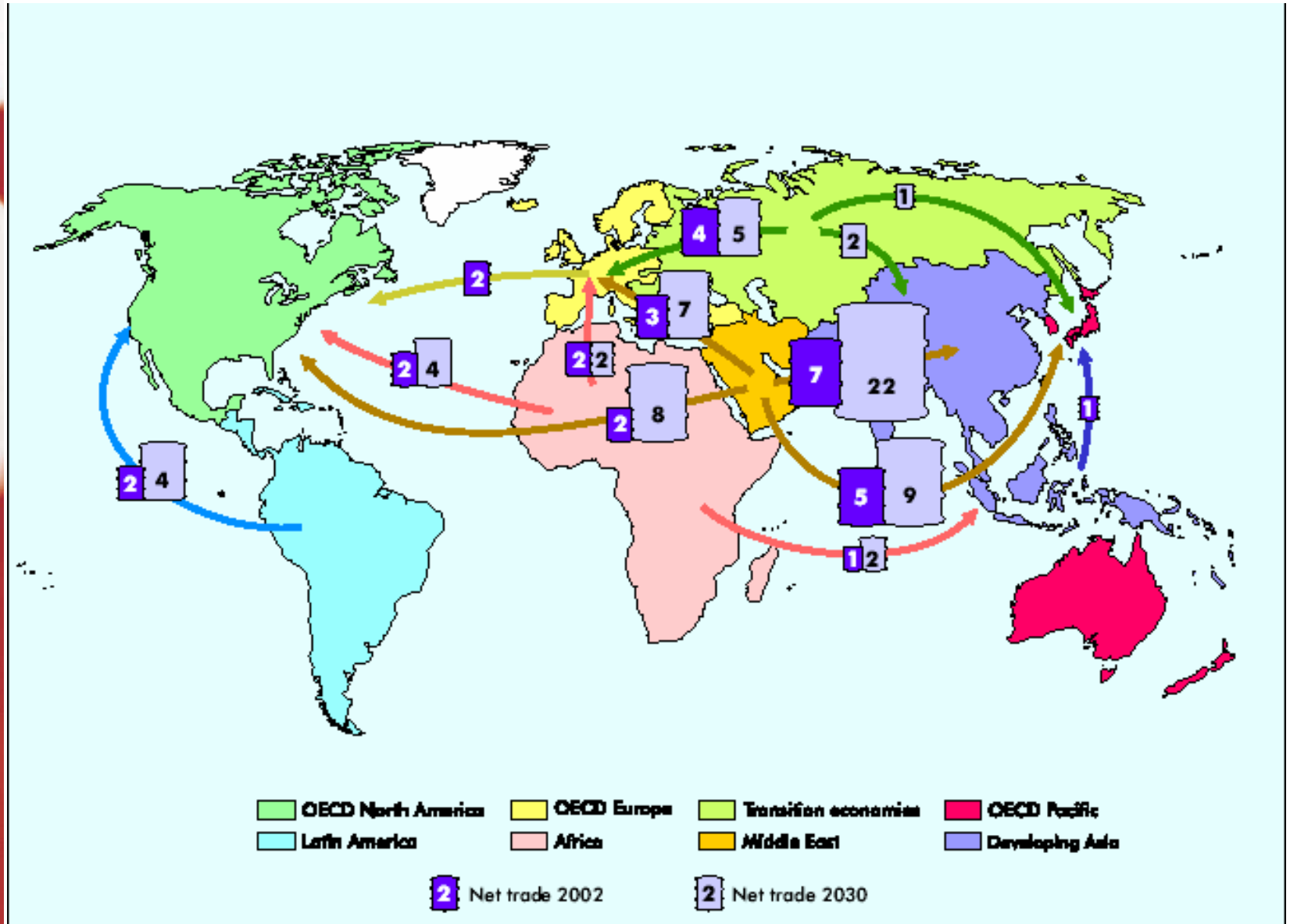
**Almost all the increase in production to 2030  
occurs outside the OECD**



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

# International Oil Trade 2002 and 2030





INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

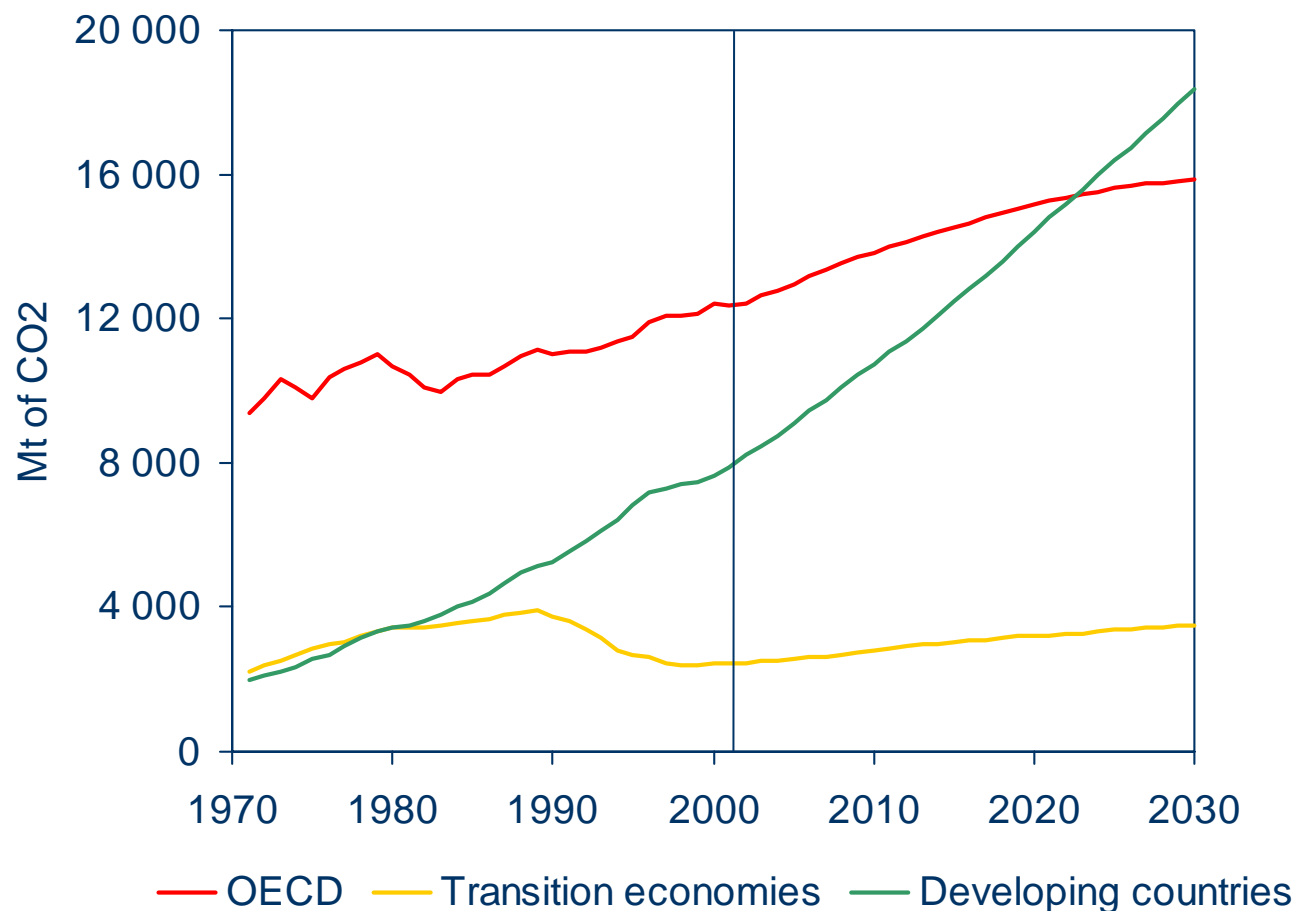
## **Challenge 2: Carbon Dioxide Emissions**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

## World Energy-Related CO<sub>2</sub> Emissions



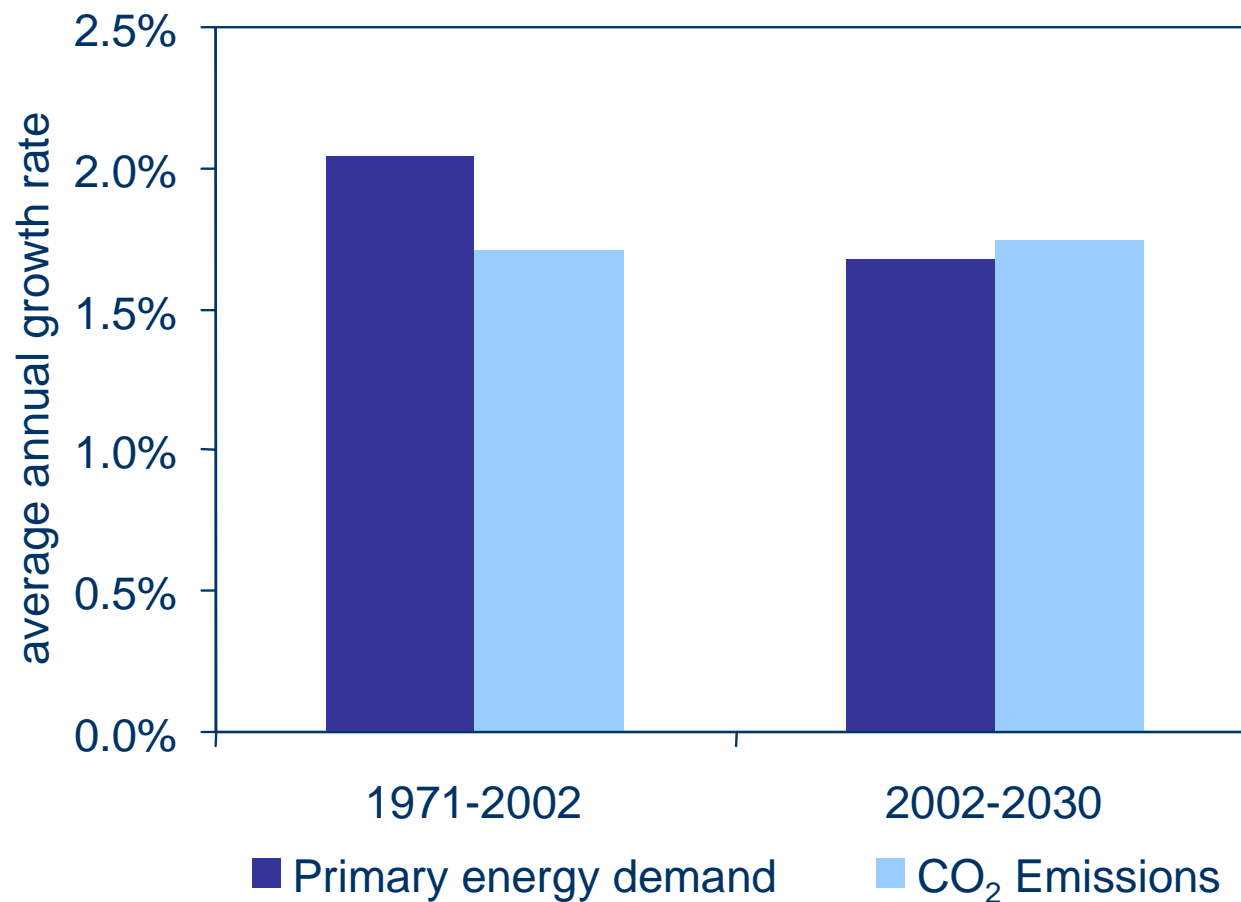
**Global emissions grow 62% between 2002 & 2030, and developing countries' emissions will overtake OECD's in the 2020s**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

## Growth in World Energy Demand and CO<sub>2</sub> Emissions



**Average carbon content of primary energy increases slightly through 2030 – in contrast to past trends**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

## **World Alternative Policy Scenario**



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

## World Alternative Policy Scenario

- Analyses impact of new environmental & energy-security policies worldwide
  - *OECD*: Policies currently under consideration
  - *Non-OECD*: Also includes more rapid declines in energy intensity resulting from faster deployment of more-efficient technology
- Impact on fuel-mix, environment & cost
- Oil, gas & electricity prices change



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

## Example: Key Policies in Alternative Scenario for European Union

### Power generation

- Renewable energy directive
- CHP directive

### ● Transport sector

- Prolongation and tightening of Voluntary Agreement with car manufacturers
- Biofuels target

### Residential and commercial sectors

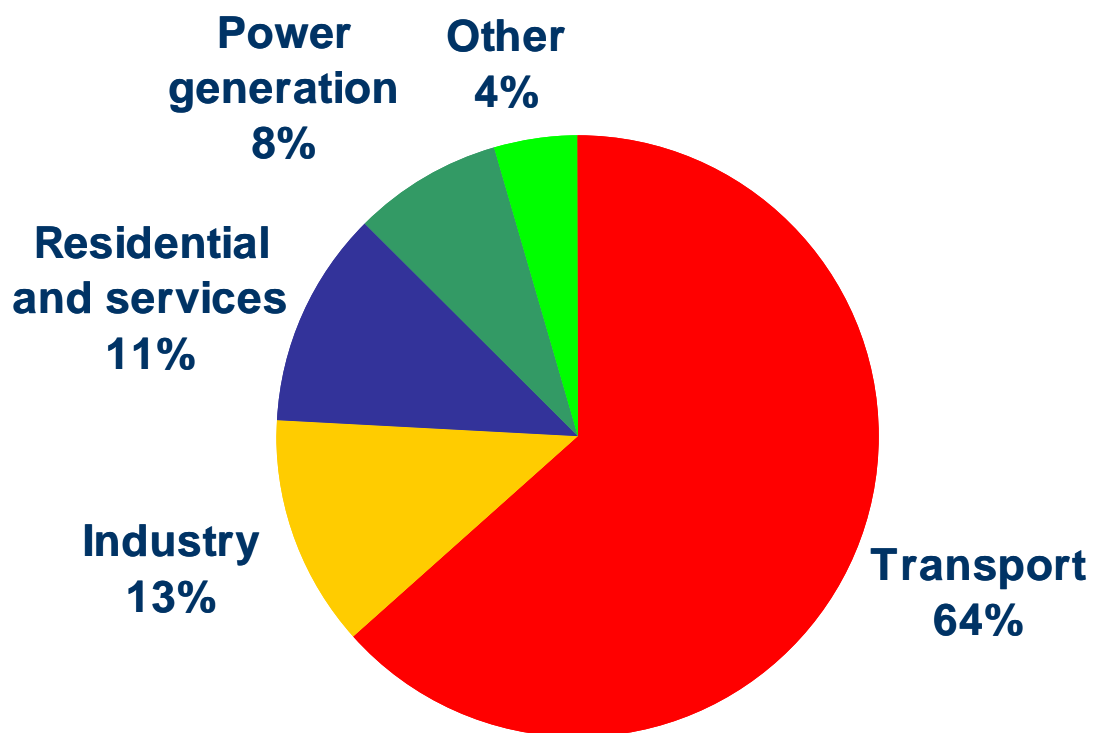
- Energy performance in buildings directive
- Energy labelling



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

## Reduction in Oil Demand in the Alternative vs. Reference Scenario, 2030



Oil savings = 12.8 mb/d

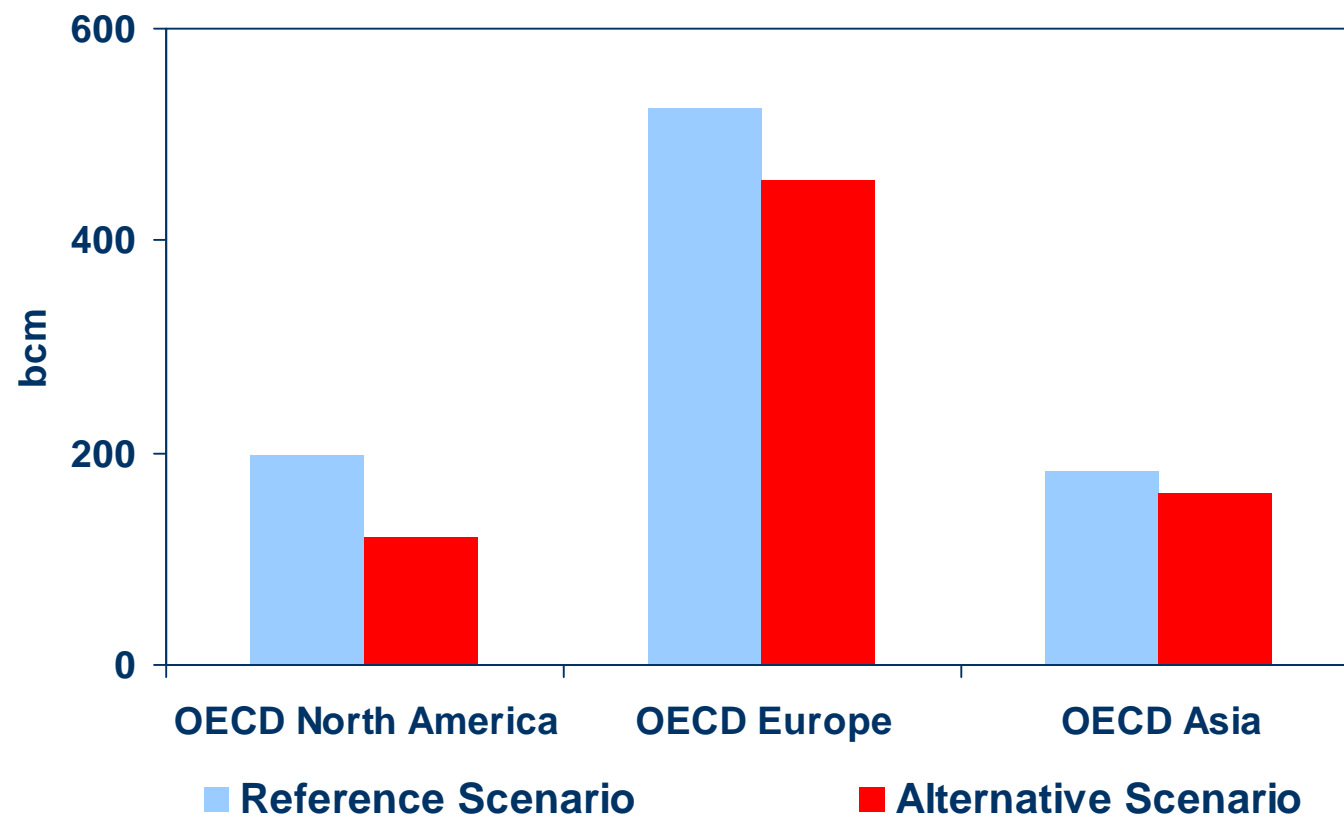
Oil savings in 2030 would be equivalent to the combined  
current production of Saudi Arabia, UAE and Nigeria



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

## Net Gas Imports in the Alternative and Reference Scenarios, 2030



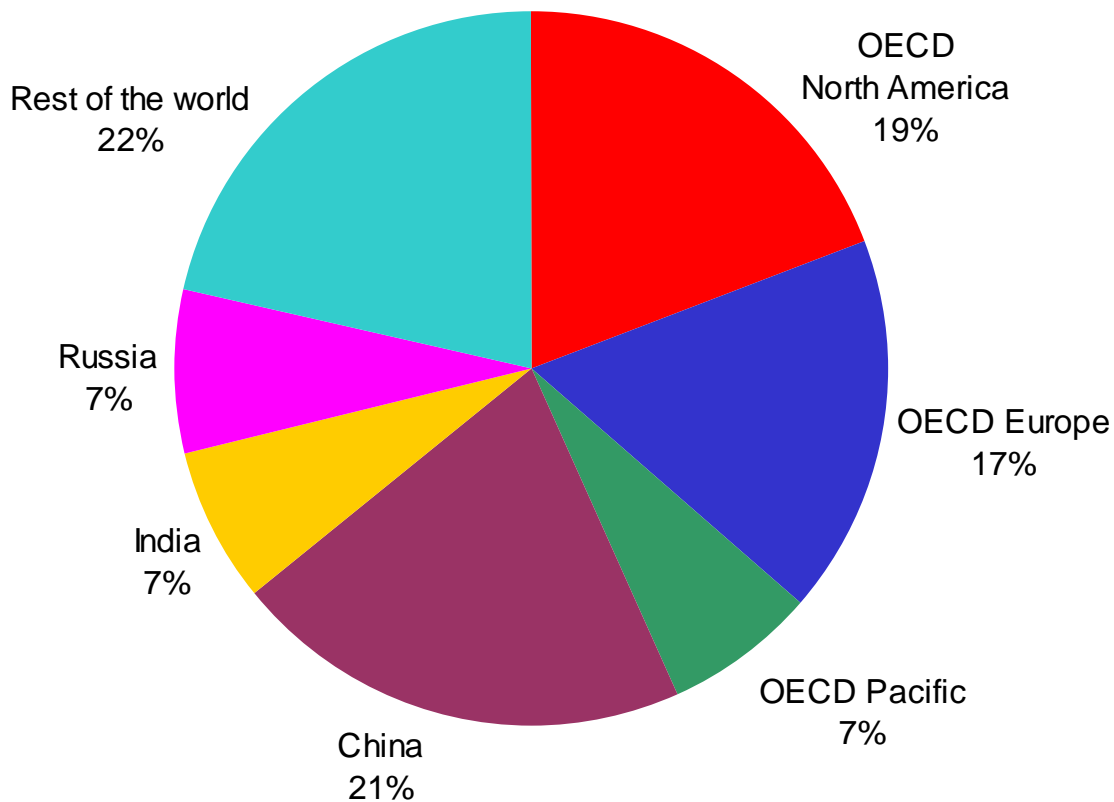
**Net gas imports are lower in all major importing regions**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

## Cumulative Reduction in CO<sub>2</sub> Emissions in the Alternative vs Reference Scenario 2002-2030



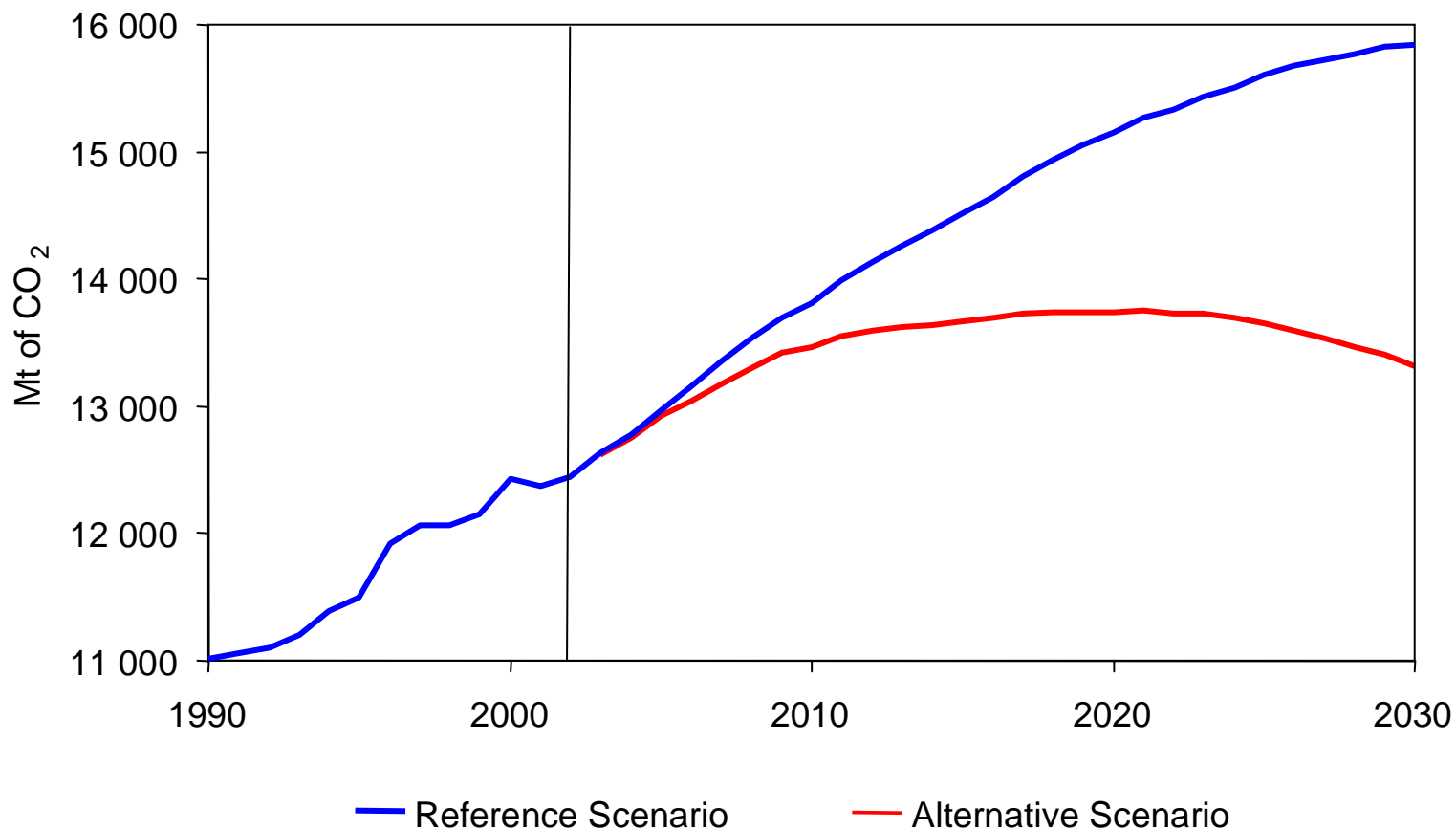
**Developing countries account for almost half the reduction in emissions**



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

## OECD CO<sub>2</sub> Emissions in the Reference and Alternative Scenarios



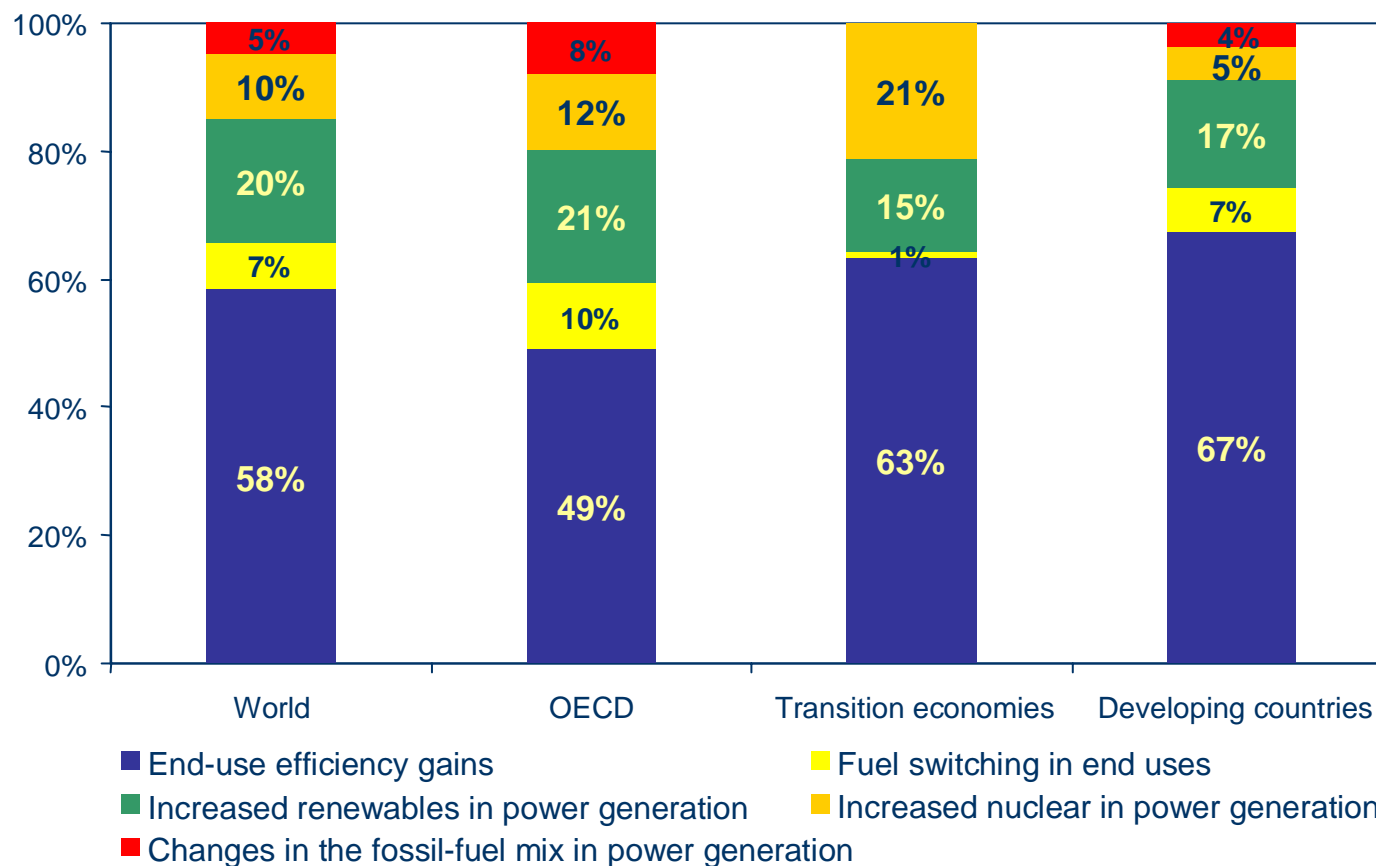
**OECD CO<sub>2</sub> emissions peak around 2020 – 25% higher than in 1990**



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

# Contributory Factors in CO<sub>2</sub> Reduction 2002-2030



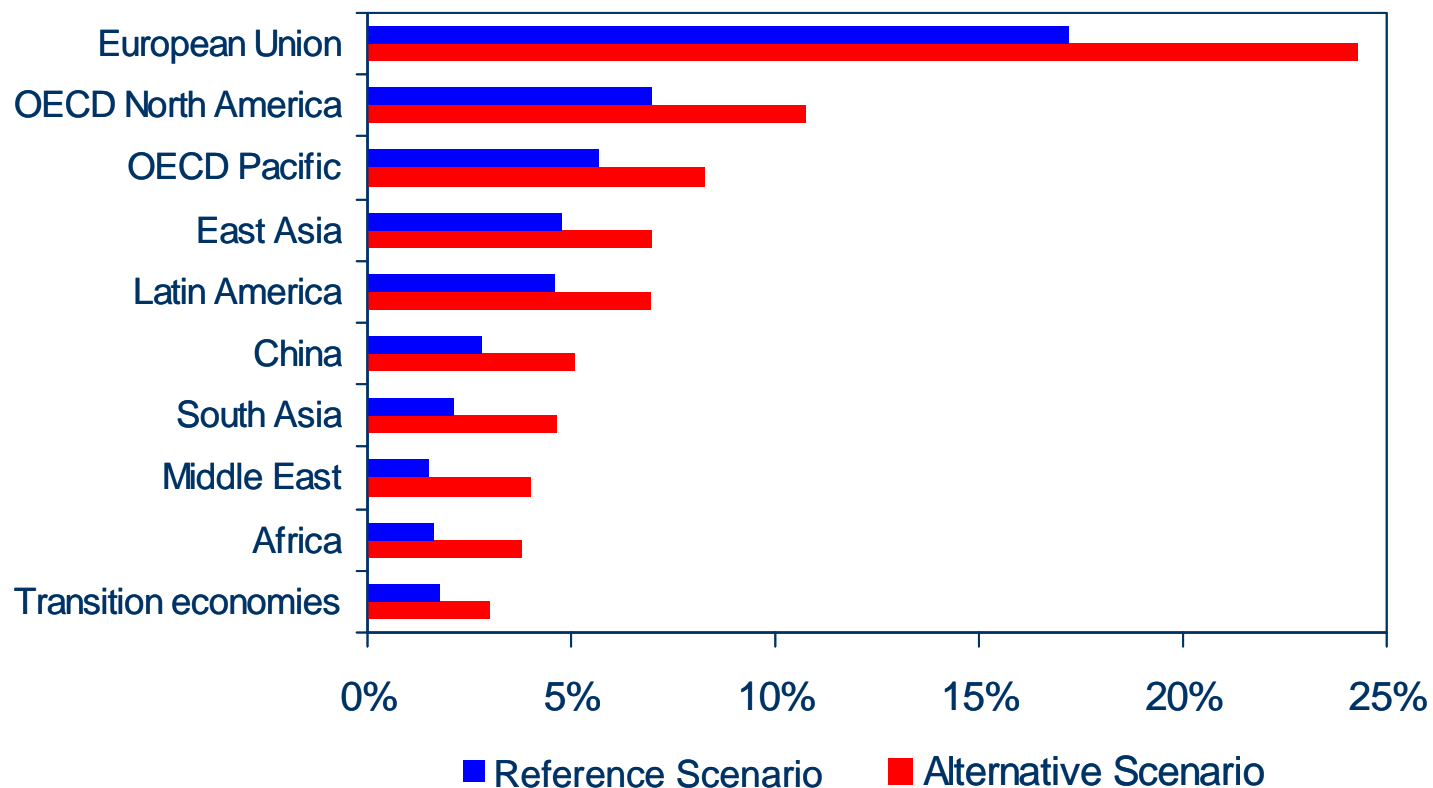
**Improvements in end-use efficiency contribute for more than half of decrease in emissions, and renewables use for 20%**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

## Share of Non-Hydro Renewables in Electricity Generation, 2030



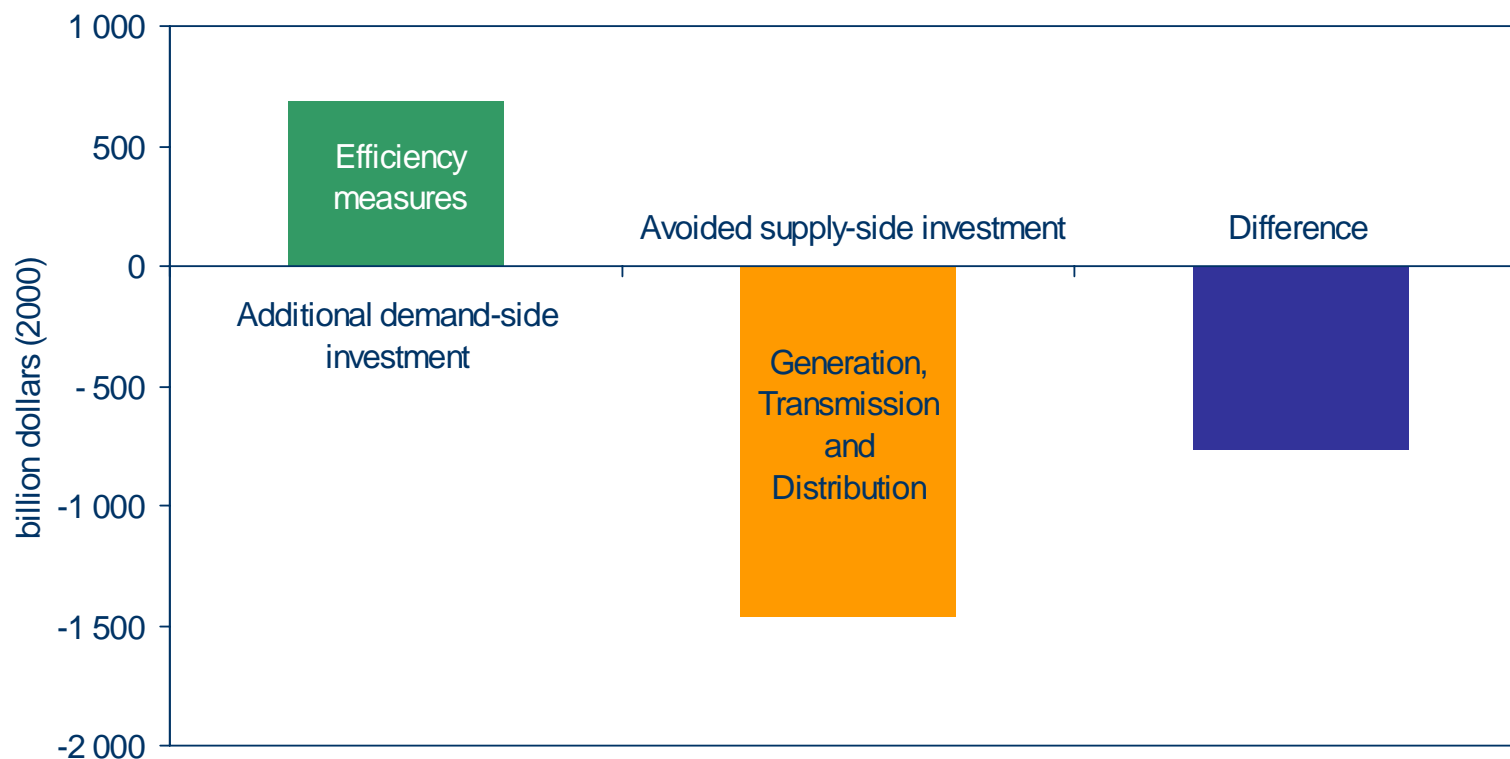
**New policies would boost the share of non-hydro-renewables in EU power generation – already the highest in the world**



INTERNATIONAL  
ENERGY AGENCY

**WORLD  
ENERGY  
OUTLOOK  
2004**

## Difference in World Electricity Investment in the Alternative vs. Reference Scenario 2003-2030



**Additional investments on the demand side are more than offset by  
lower investment on the supply side**



INTERNATIONAL  
ENERGY AGENCY

WORLD  
ENERGY  
OUTLOOK  
2004

## Summary & Conclusions

- On current policies, world energy needs – and CO<sub>2</sub> emissions – will be 60% higher in 2030 than now
- Policies under consideration & faster deployment of technology could substantially save energy and reduce emissions
- Larger capital needs on the demand side would be entirely offset by lower investment needs on the supply side
- Increased efficiency and renewables can significantly contribute toward meeting these challenges
- **Urgent & decisive government action is needed**