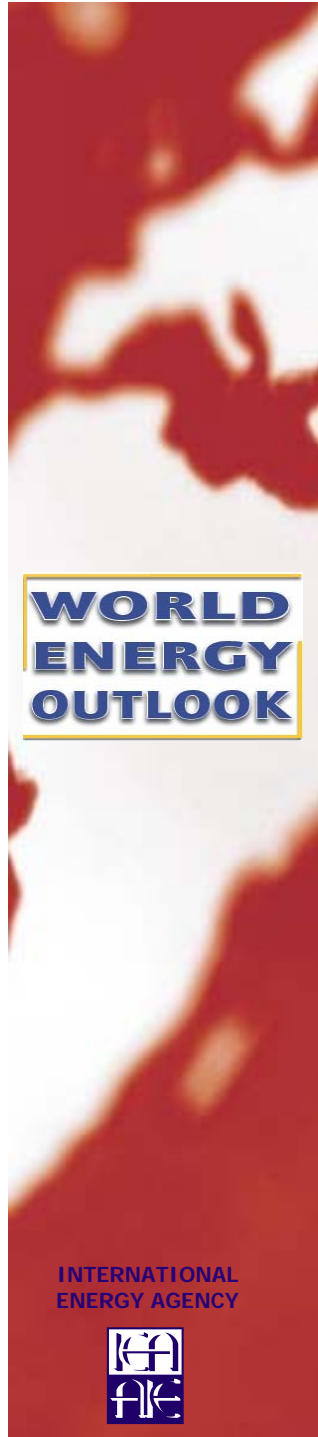




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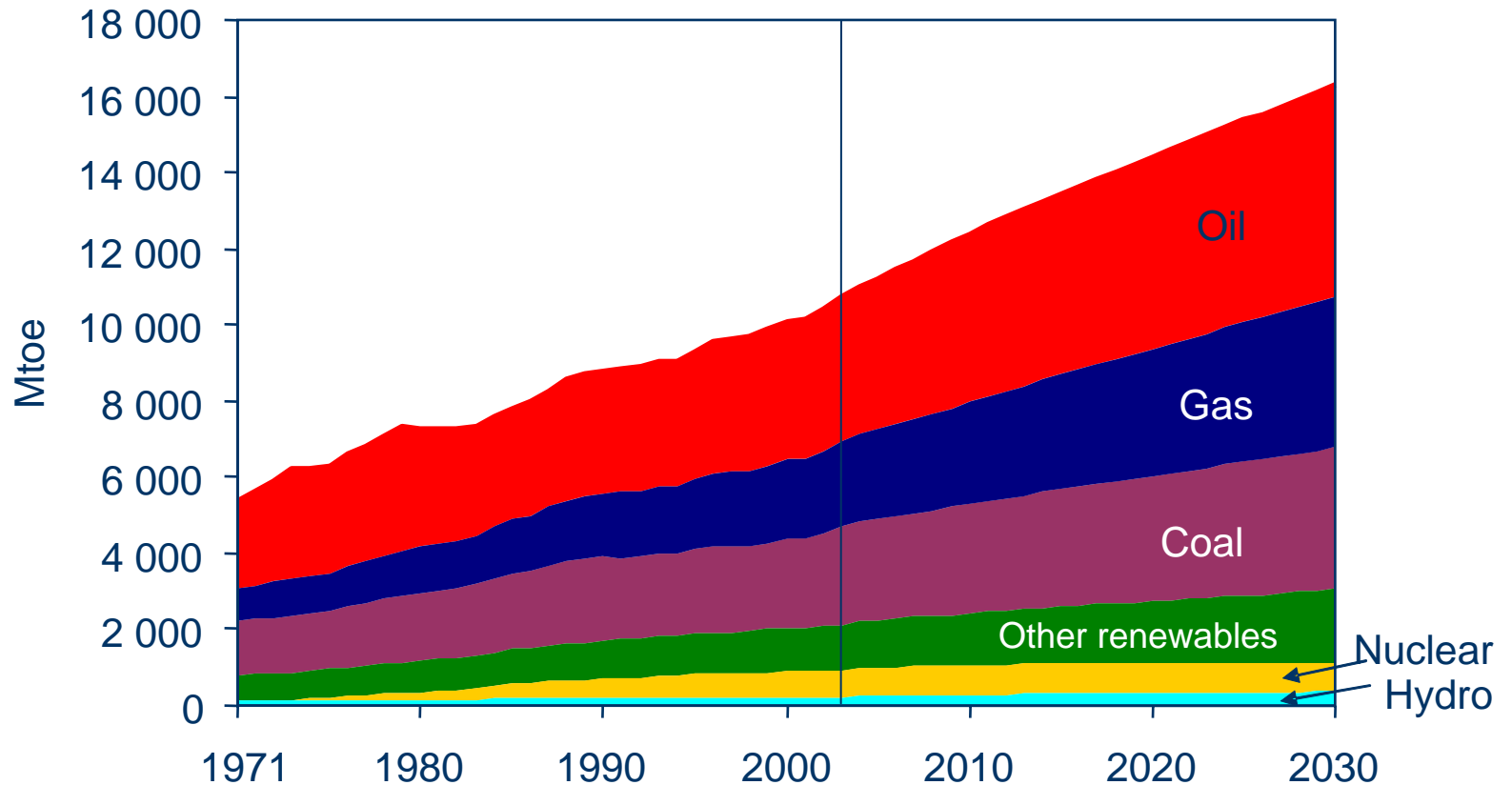
World Energy Outlook: Key Strategic Challenges

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



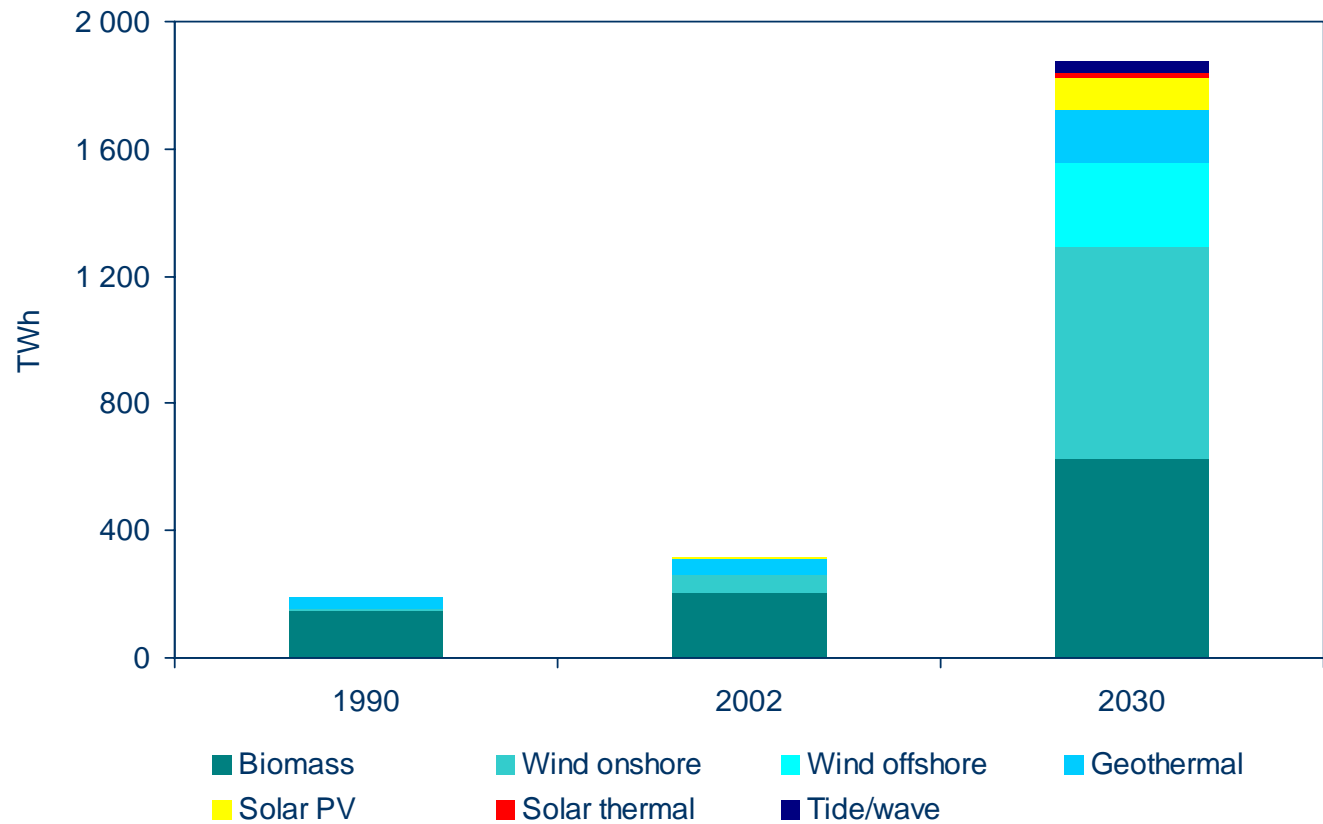
Energy Trends & Strategic Challenges Reference Scenario

World Primary Energy Demand



Oil and gas together account for more than 60% of the growth in energy demand between now and 2030 in the Reference Scenario

World Power Generation from Non-Hydro Renewable Energy Sources

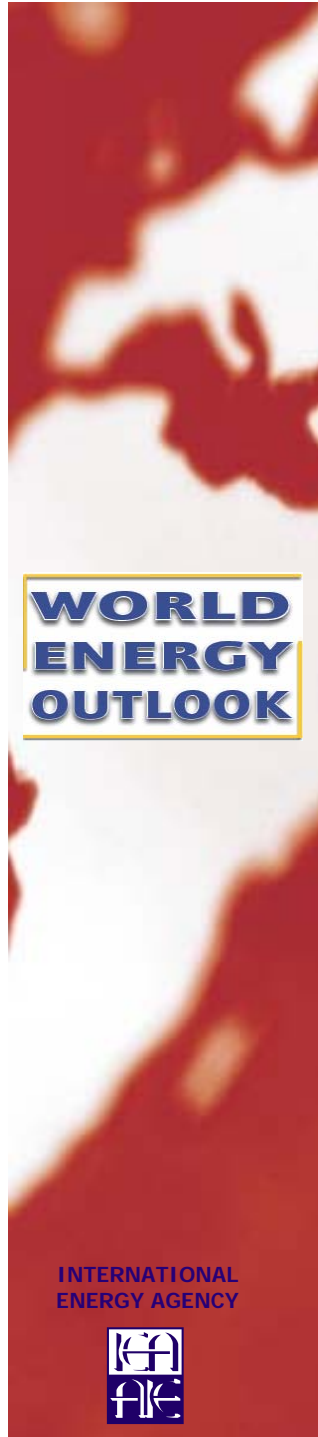


World non-hydro renewable electricity generation increases six-fold to 2030, mainly due to wind & biomass

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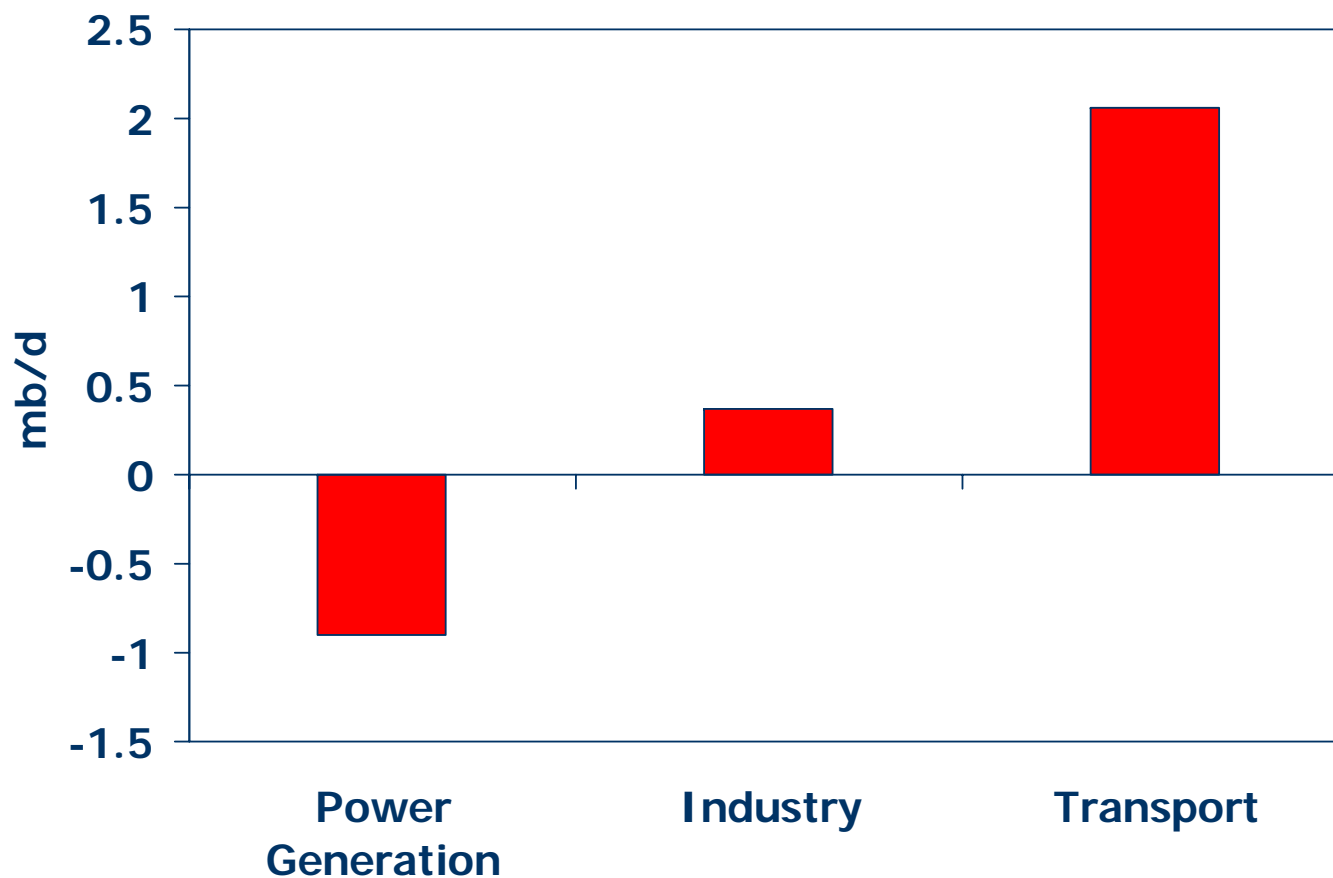
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Challenge 1: Security of Supply

OECD Oil Demand Growth by Sector, 1999-2005



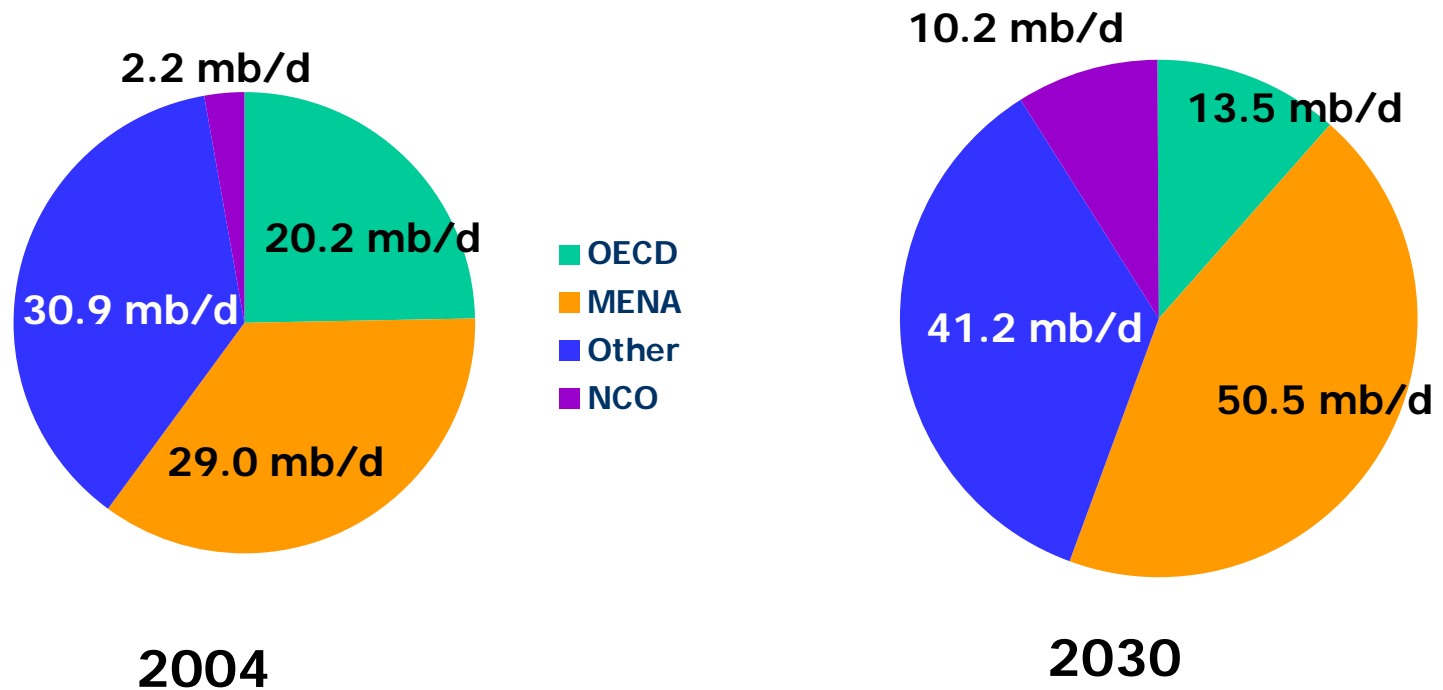
In the OECD, the transport sector accounted for almost all the oil demand growth

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World Oil Production Shifts Away from OECD



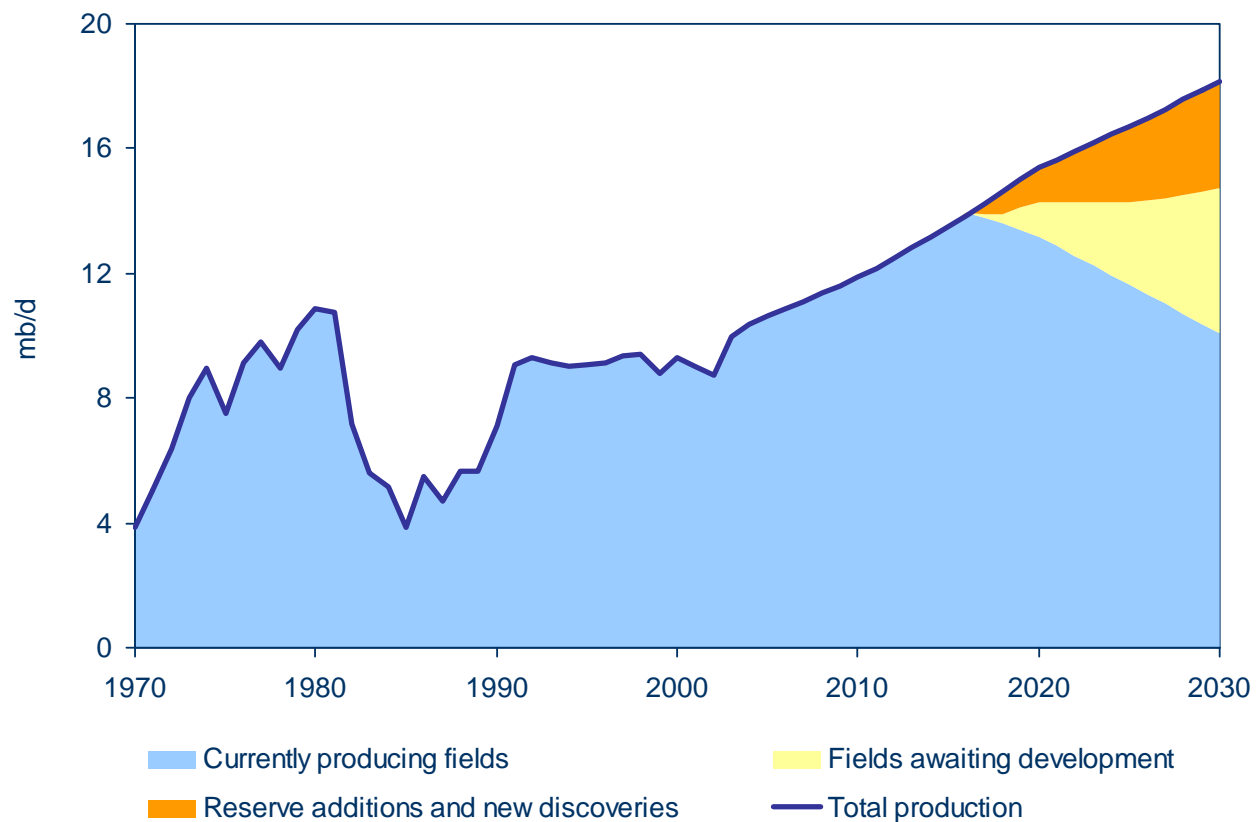
Global oil production climbs from 82 mb/d in 2004 to 115 mb/d in 2030; OECD share falls from 25% to 12%

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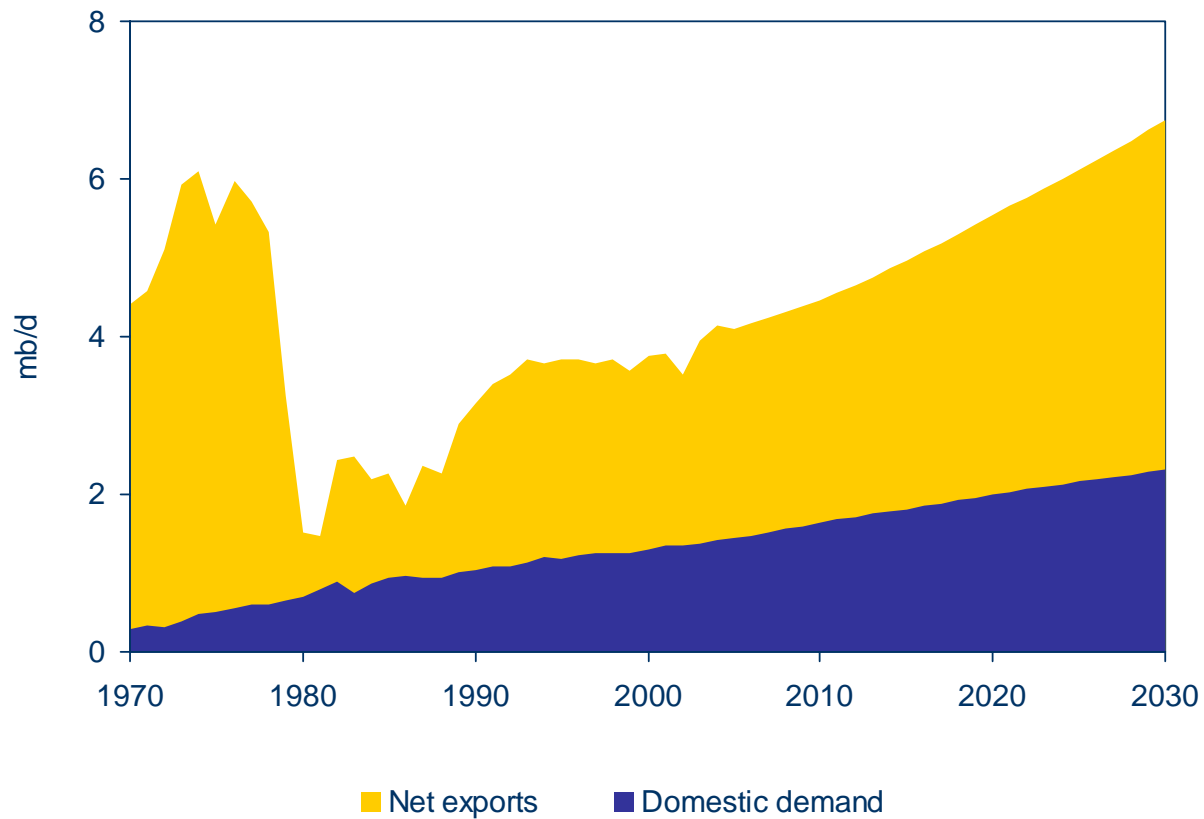


Saudi Arabia's Oil Production by Source in the Reference Scenario

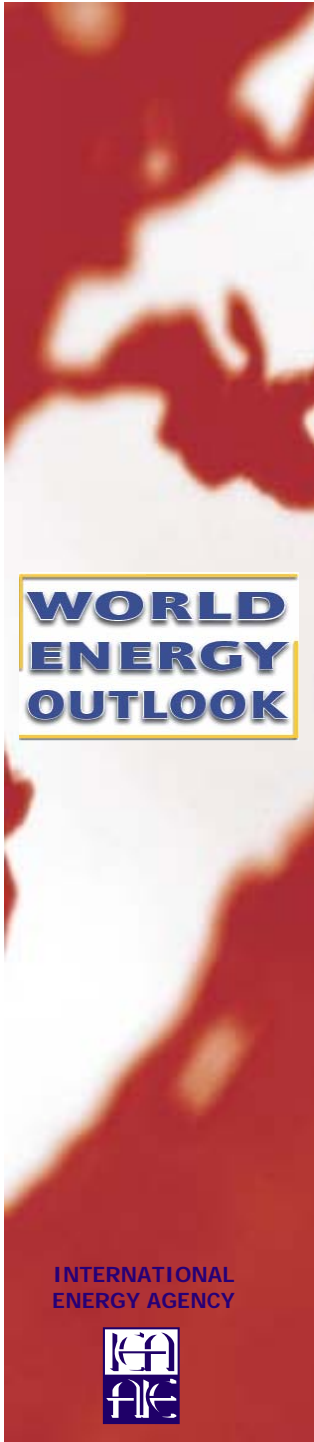


***Based on its reserves and global demand trends,
Saudi oil production is projected to reach 18 mb/d in 2030***

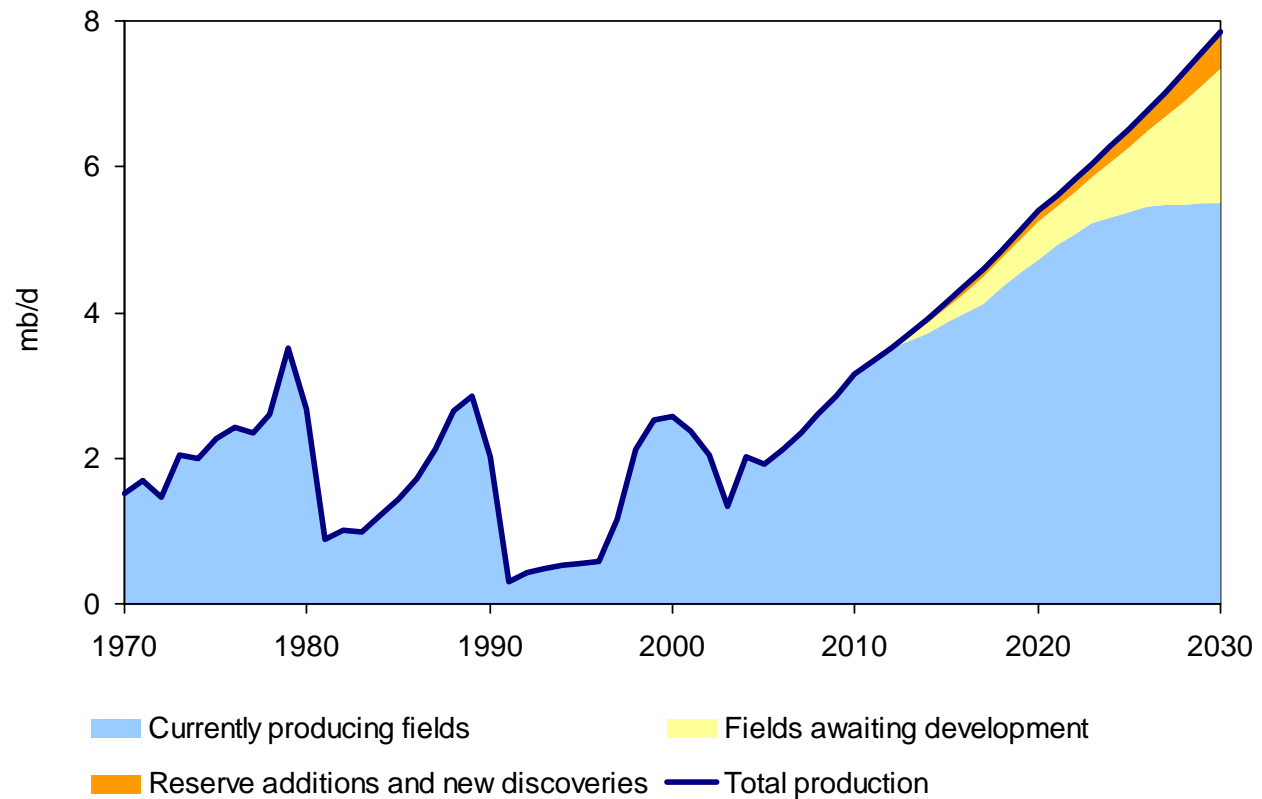
Iran's Oil Balance in the Reference Scenario



Iran oil production reaches 6.8 mb/d in 2030, but exports increase less rapidly due to strong growth in domestic demand

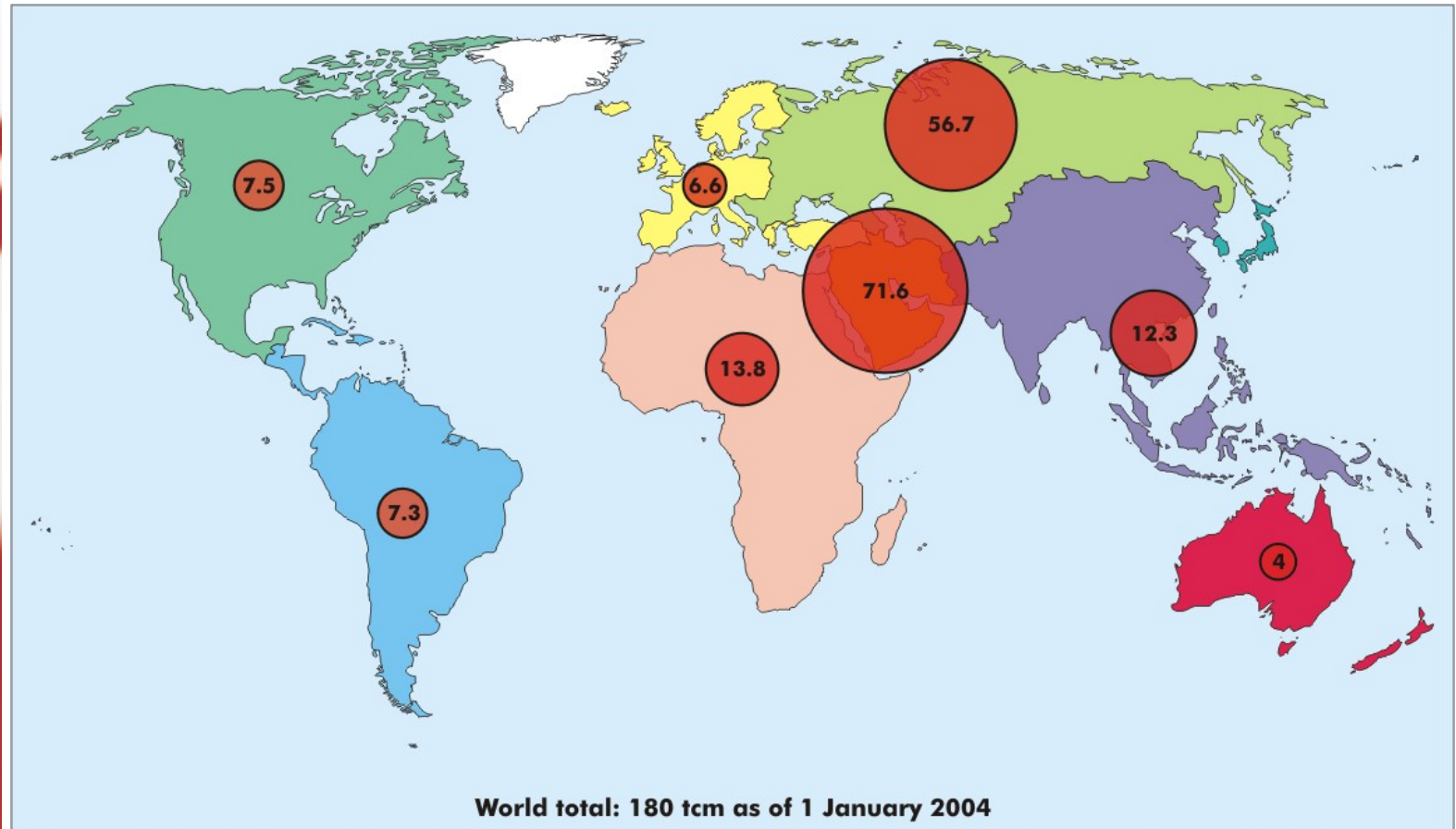


Oil Production Outlook in Iraq in the Reference Scenario



Oil production in Iraq is expected to reach around 3 mb/d in 2010 and 8 mb/d in 2030, provided that stability and security are restored

Proven Natural Gas Reserves

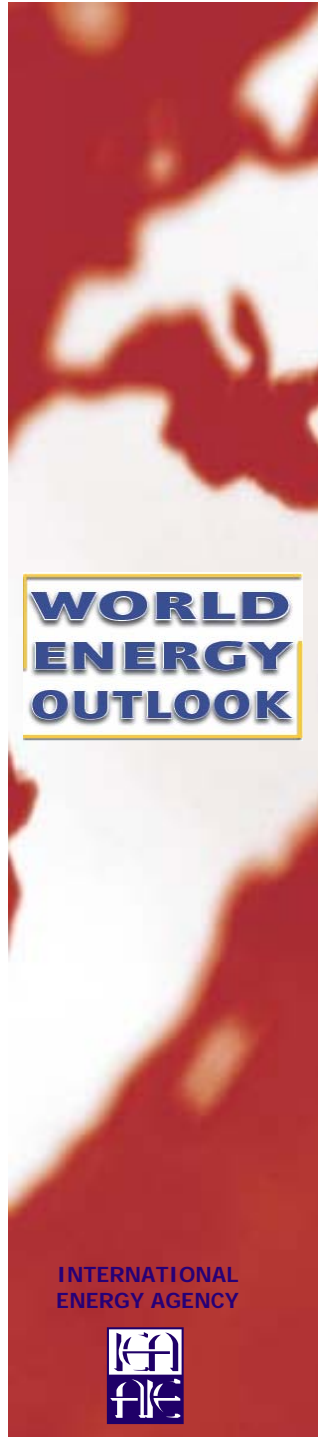


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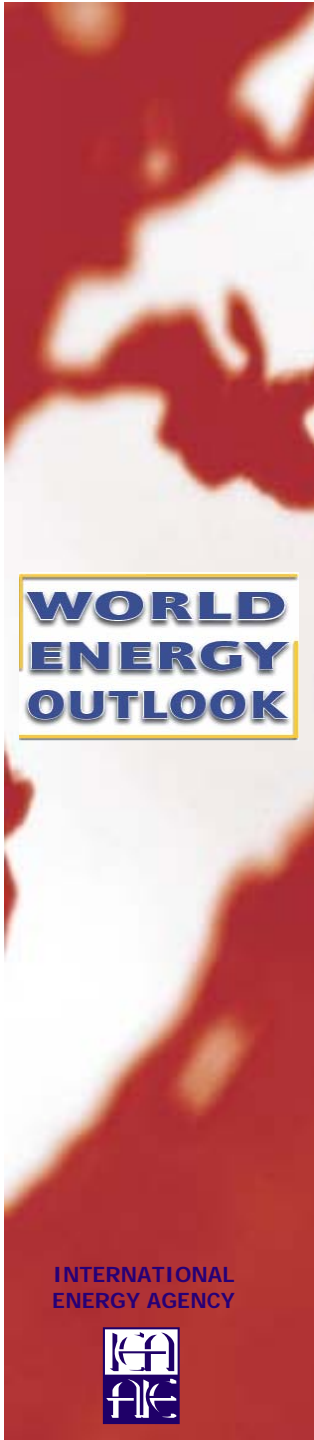
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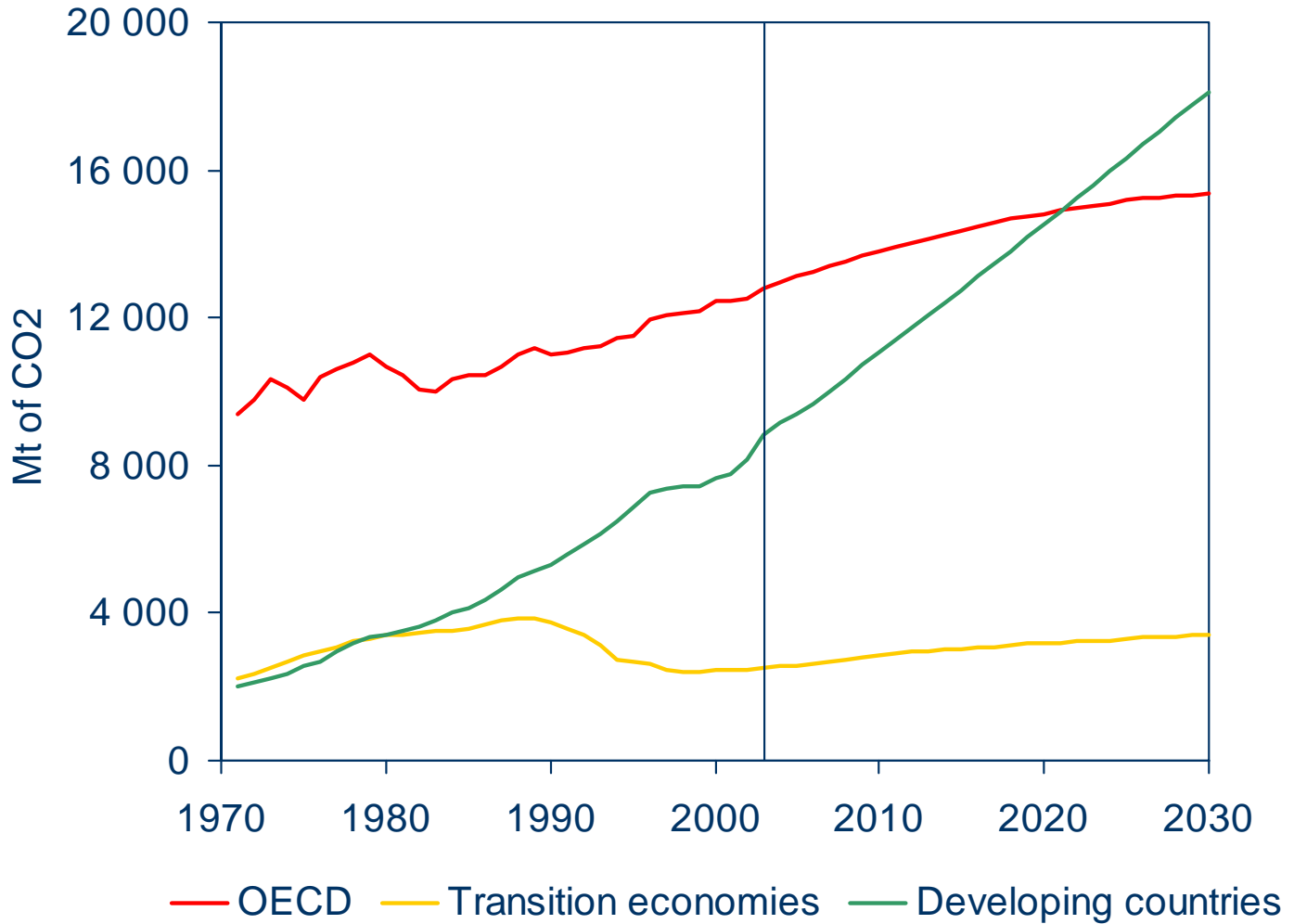
**Gas reserves are concentrated in FSU and MENA regions –
Russia and Iran together account almost half of global gas
reserves**



Challenge 2: Carbon Dioxide Emissions

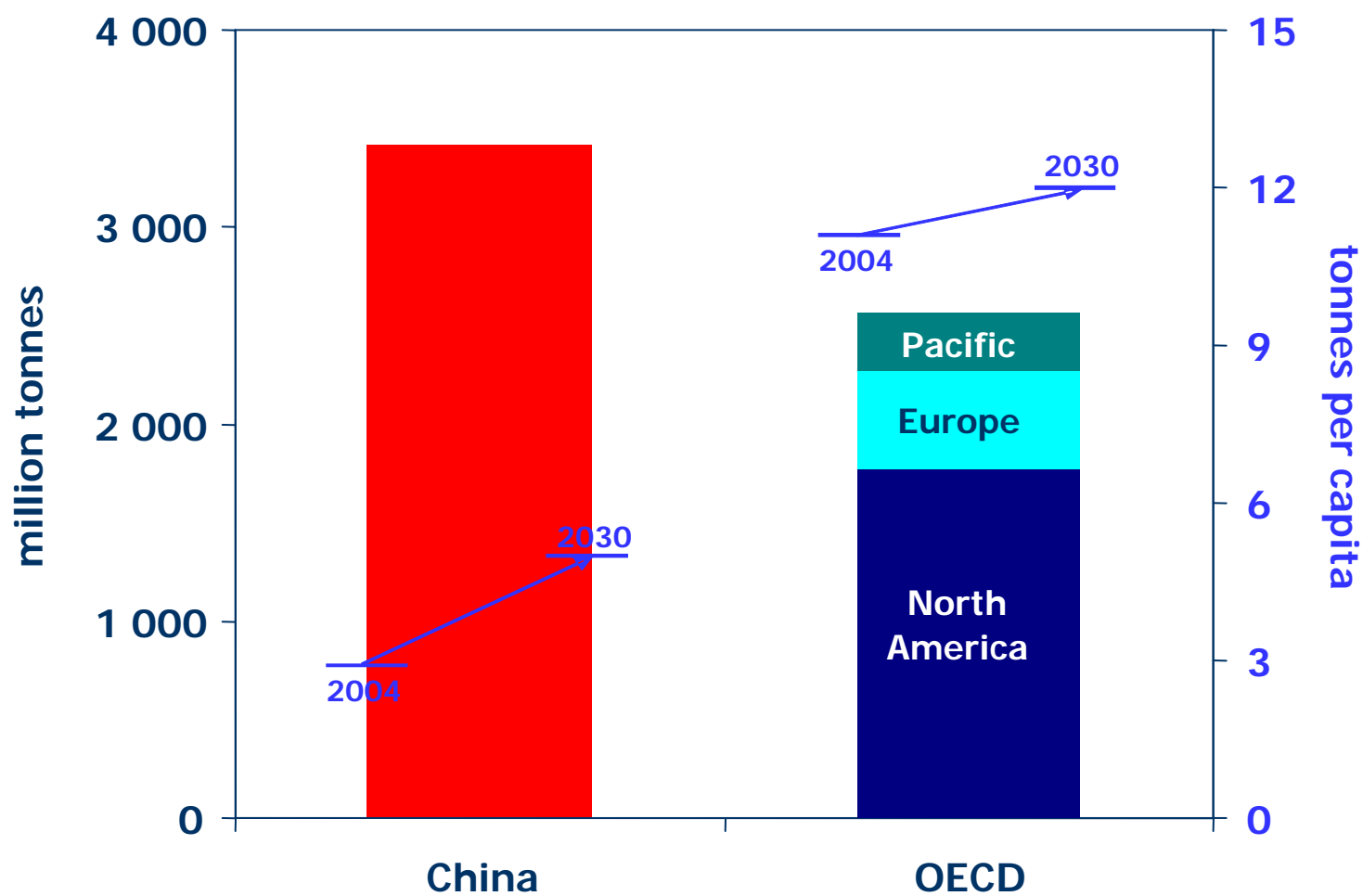


Energy-Related CO₂ Emissions by Region



Global emissions grow more than 50% between now & 2030, with developing countries' emissions overtaking OECD's in the 2020s

CO₂ Increase, 2004-2030



OECD CO₂ additions equal to only three quarters of Chinese CO₂ rise, but OECD emissions per capita still two times higher in 2030

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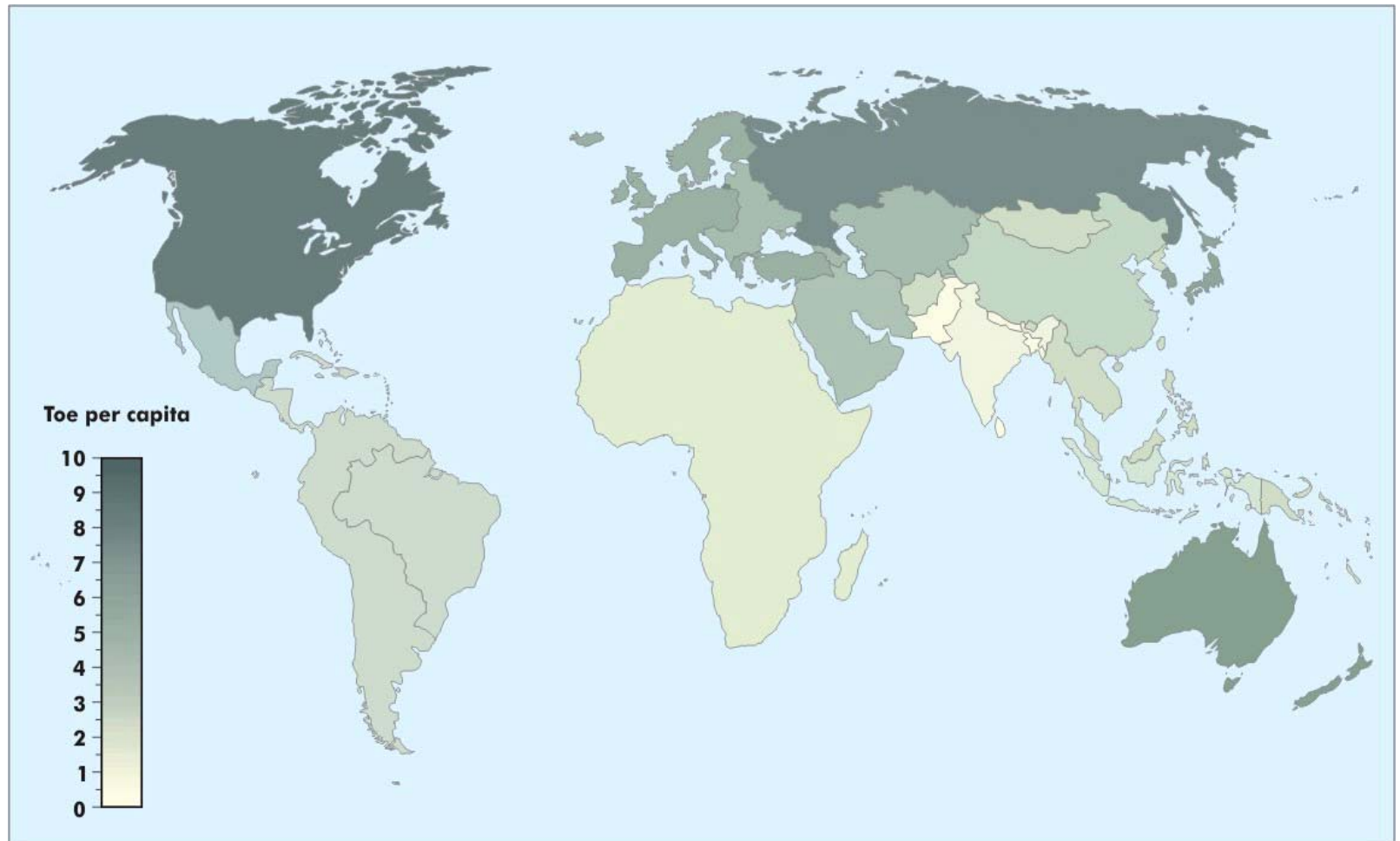
Challenge 3: Energy and Poverty

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Per Capita Primary Energy Use, 2030



Per capita energy use remains much lower in developing countries

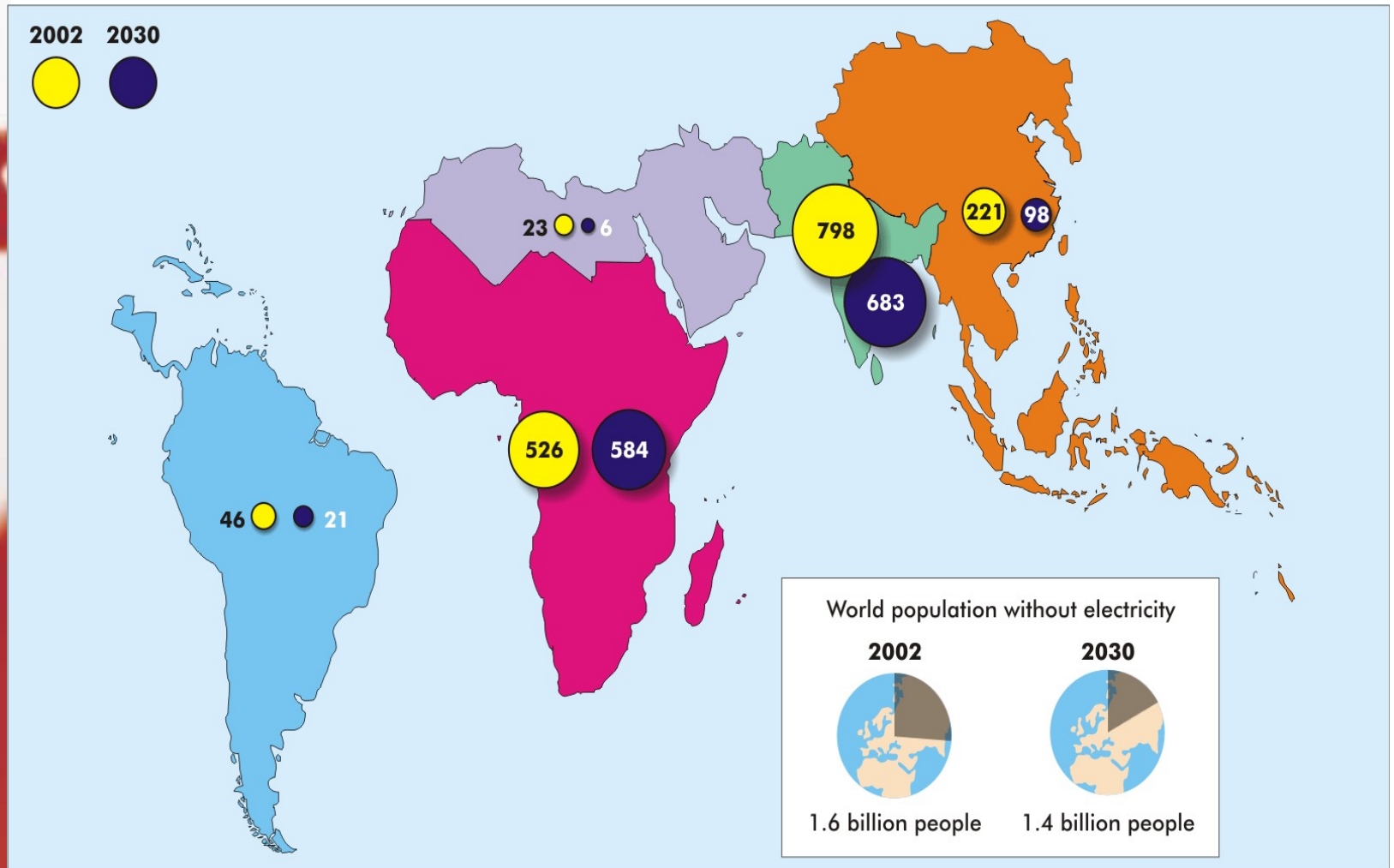
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Electricity Deprivation

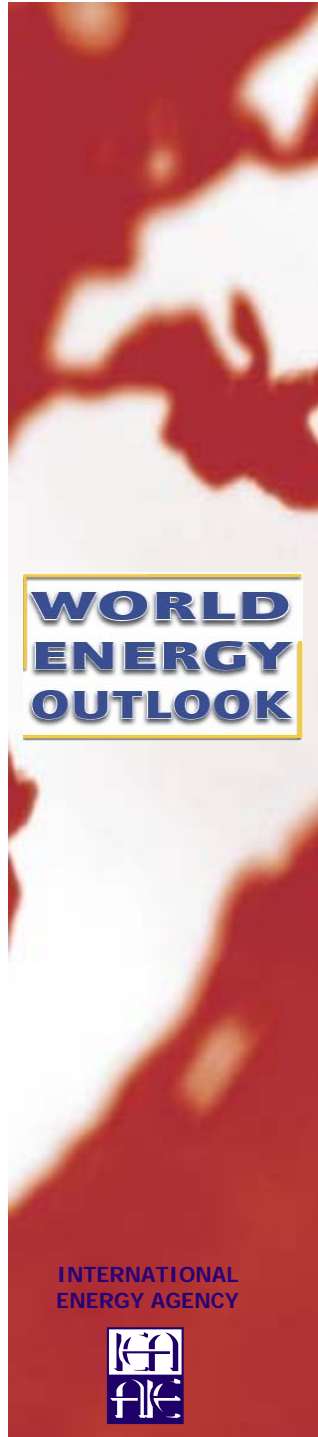
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In 2030, if no new policies are implemented, there will still be 1.4 billion people without electricity

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World Alternative Policy Scenario

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Examples of Policies included in the Alternative Scenario

Power generation

- Renewable energy (e.g., EU renewables directive)
- Cleaner coal technology (e.g., China and India)

●Transport sector

- Improve vehicle fuel efficiency (e.g. strengthening of US CAFE standards, extension of Chinese standards)
- Increased sales of alternative fuel vehicles and fuels (e.g., biofuels in Europe, Brazil)

Residential and commercial sectors

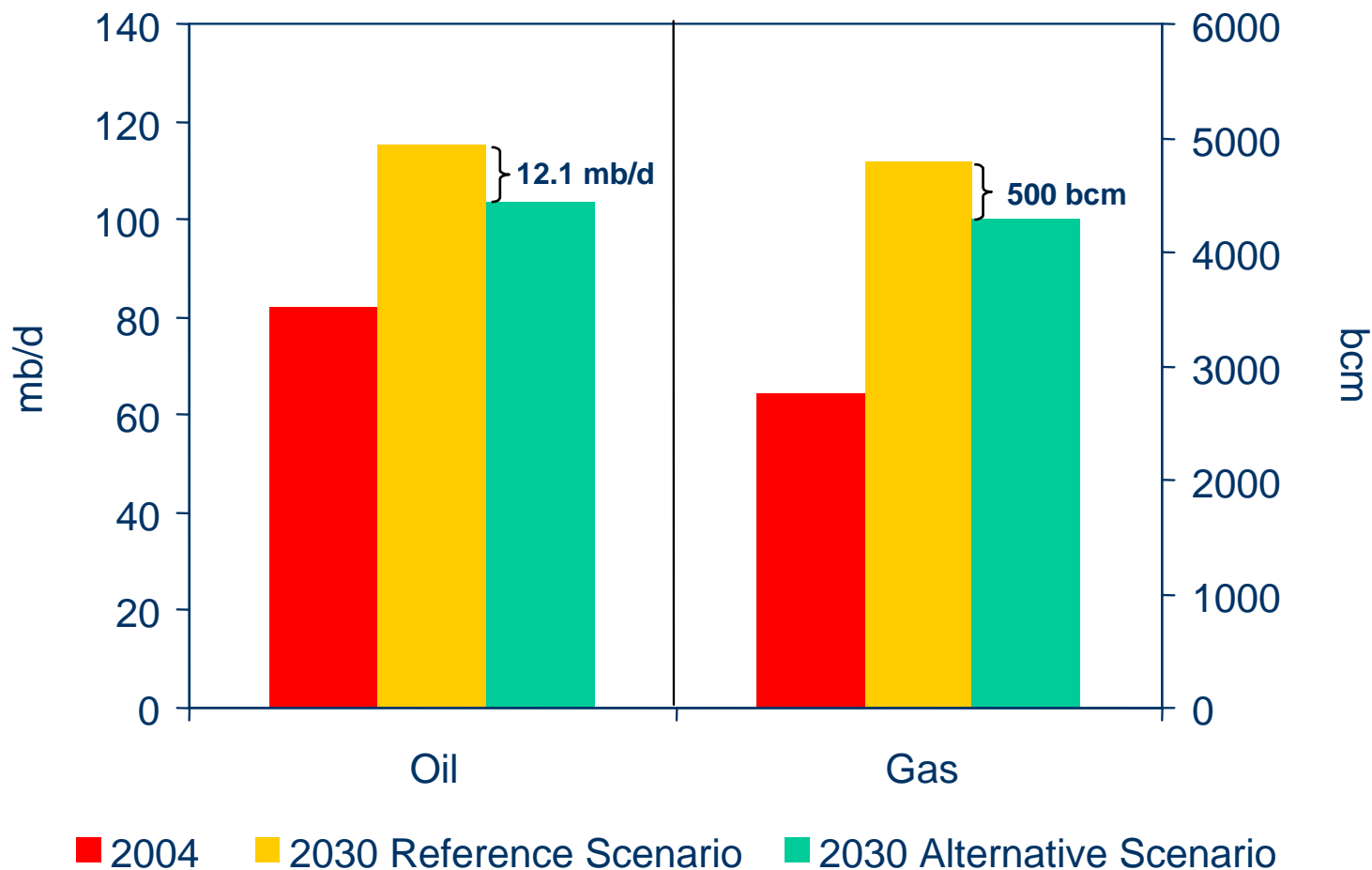
- Building codes (e.g., US)
- Efficiency standards and labelling for appliances (e.g., India)

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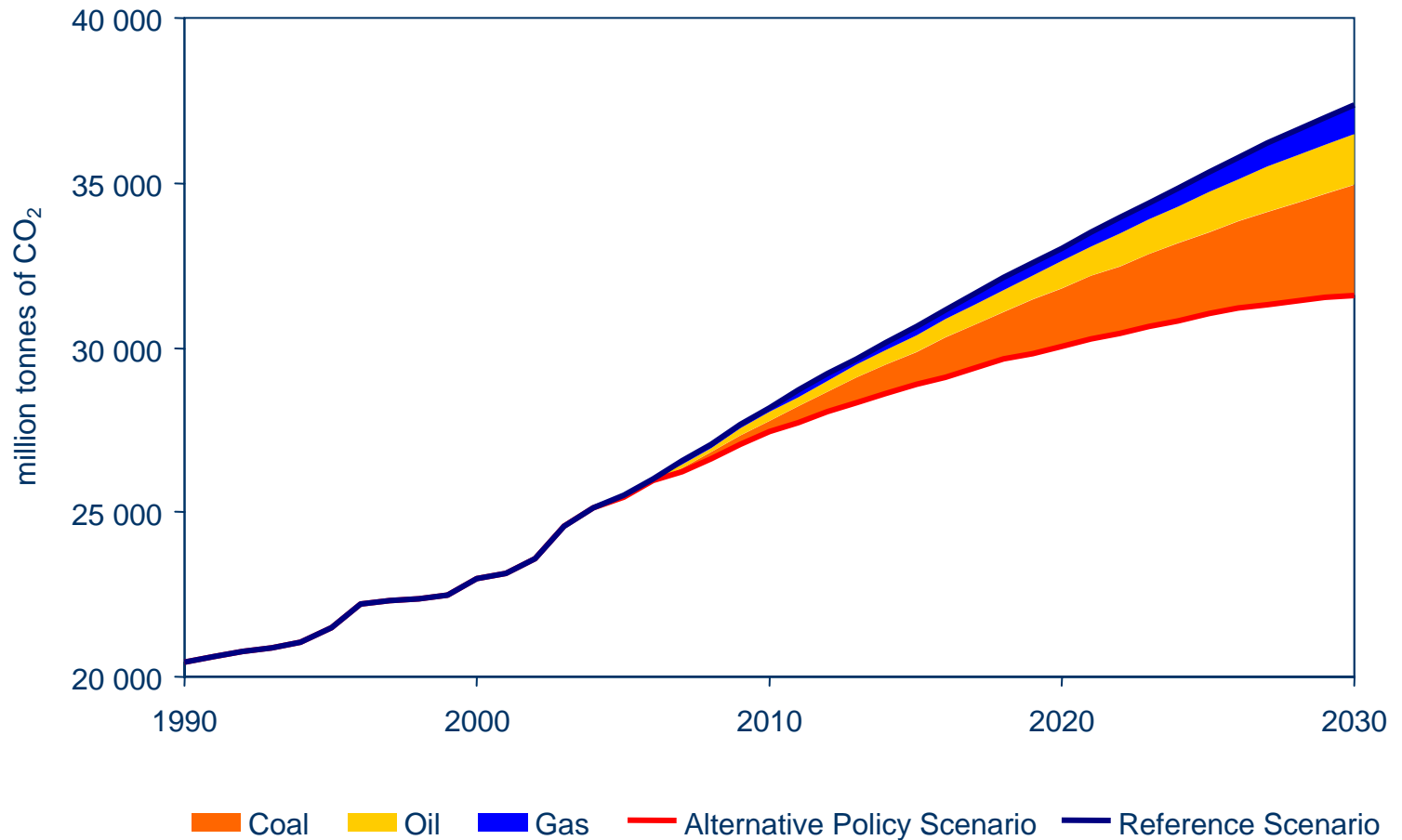


Oil/Gas Demand in the Reference and Alternative Policy Scenarios



Oil & gas demand in the Alternative Scenario are both 10% lower in 2030 due to significant energy savings and a shift in the energy mix

Global Energy-Related CO₂ Emissions in the Reference and Alternative Policy Scenarios



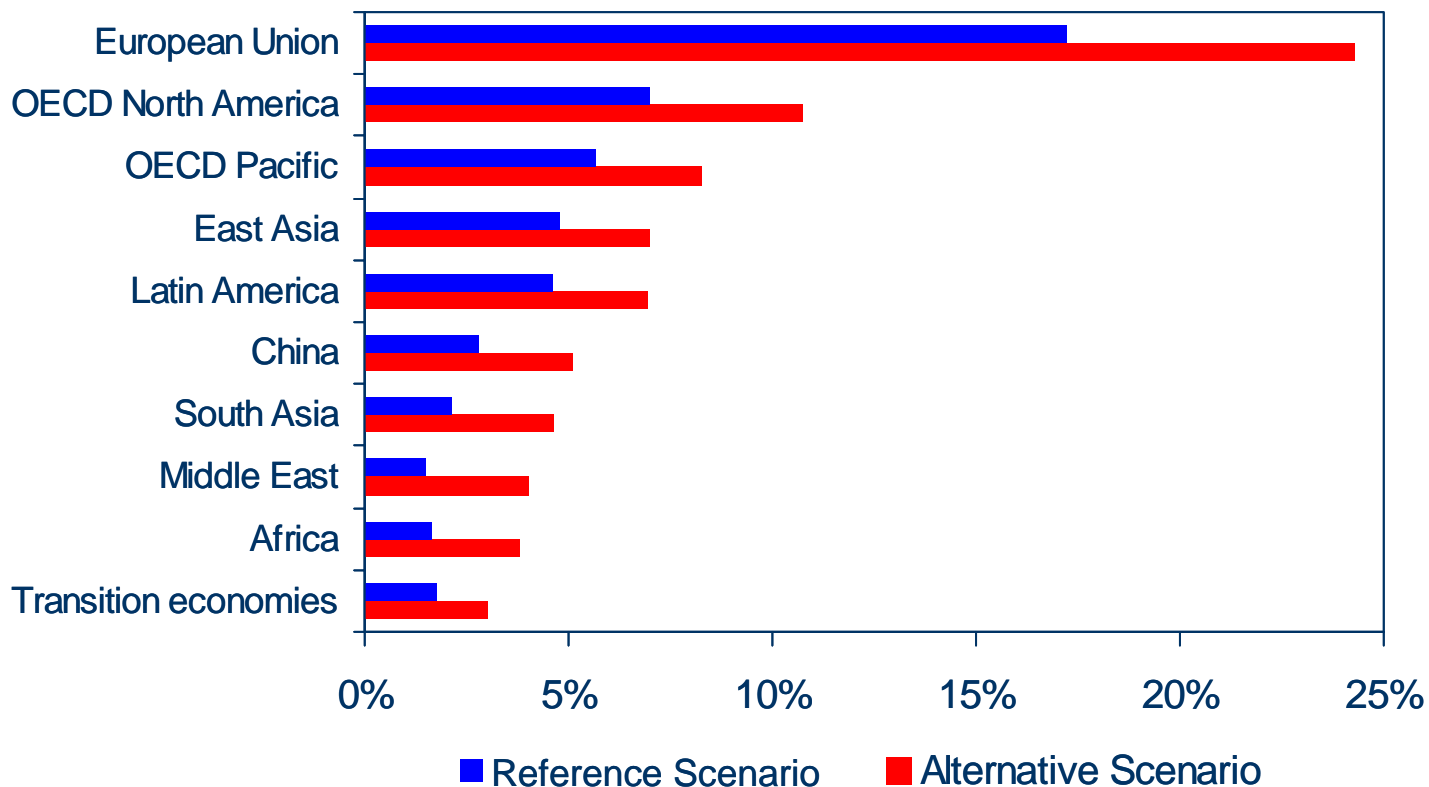
In 2030, CO₂ emissions are 16% lower than in the Reference Scenario, but are still more than 50% higher than 1990

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Share of Non-Hydro Renewables in Electricity Generation, 2030



New policies would boost the share of non-hydro-renewables in global energy mix

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Summary & Conclusions

- Projected market trends raise serious concerns
 - Increased risk for energy security
 - Rising environmental concerns
 - Persistent energy poverty
- More vigorous policies would curb rate of increase in energy demand and emission significantly
- Renewables can significantly contribute toward meeting these challenges
- Urgent and decisive government action needed

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WEO 2006: Preliminary plan

- World Alternative Policy Scenario
 - a “tool for change” - asked by G-8
 - Deepening and broadening the analysis for developing countries
- Impact of high energy prices
 - Impact of high oil, gas and electricity prices on energy demand and macro economy
 - Focus on developing Asia and Africa
- Energy and Development
 - Focus on unsustainable use of biomass
- Country in focus: Brazil (ethanol, bagasse in CHP)

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