

WORLD ENERGY INVESTMENT OUTLOOK

Global Strategic Energy Challenges

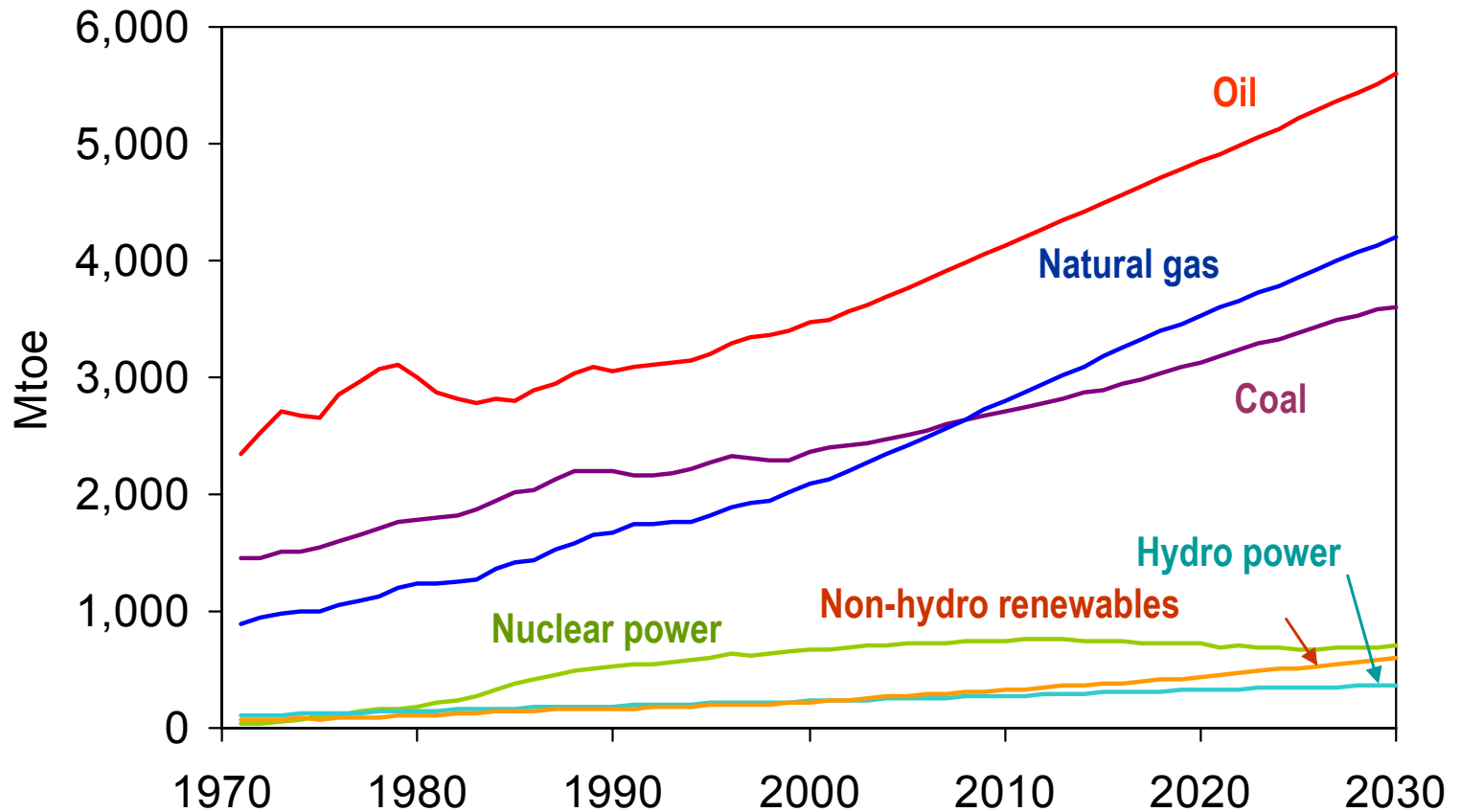
Dr. Fatih Birol
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Head, Economic Analysis Division
International Energy Agency

US DOE
Special Award
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World Primary Energy Demand



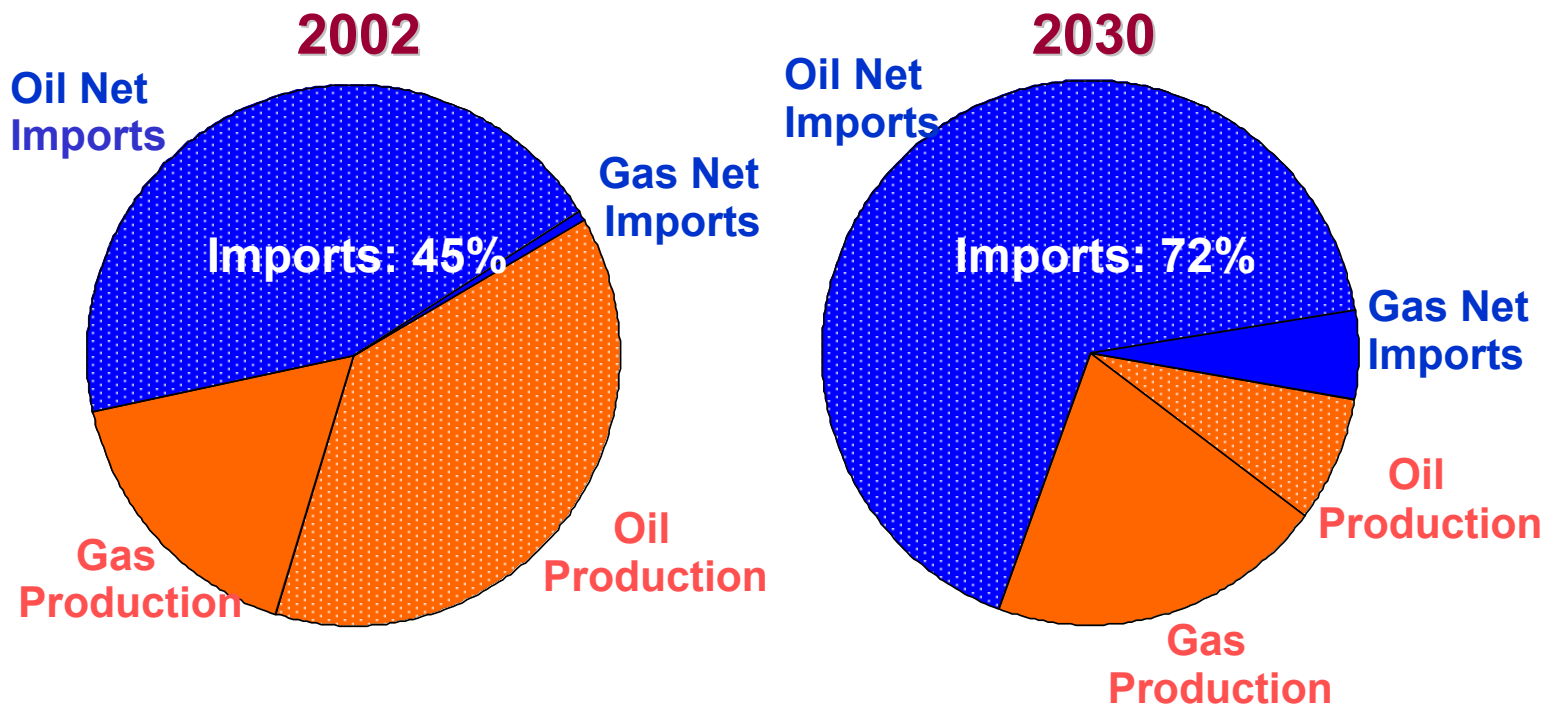
Gas grows fastest in absolute terms & non-hydro renewables fastest in % terms, but oil remains the dominant fuel in 2030

Global Strategic Challenges

- **Security of energy supplies**
- **Threat of environmental damage caused by energy use**
- **Uneven access of the world's population to modern energy**
- **Investment in energy-supply infrastructure**



Developing Asia Oil and Gas Imports



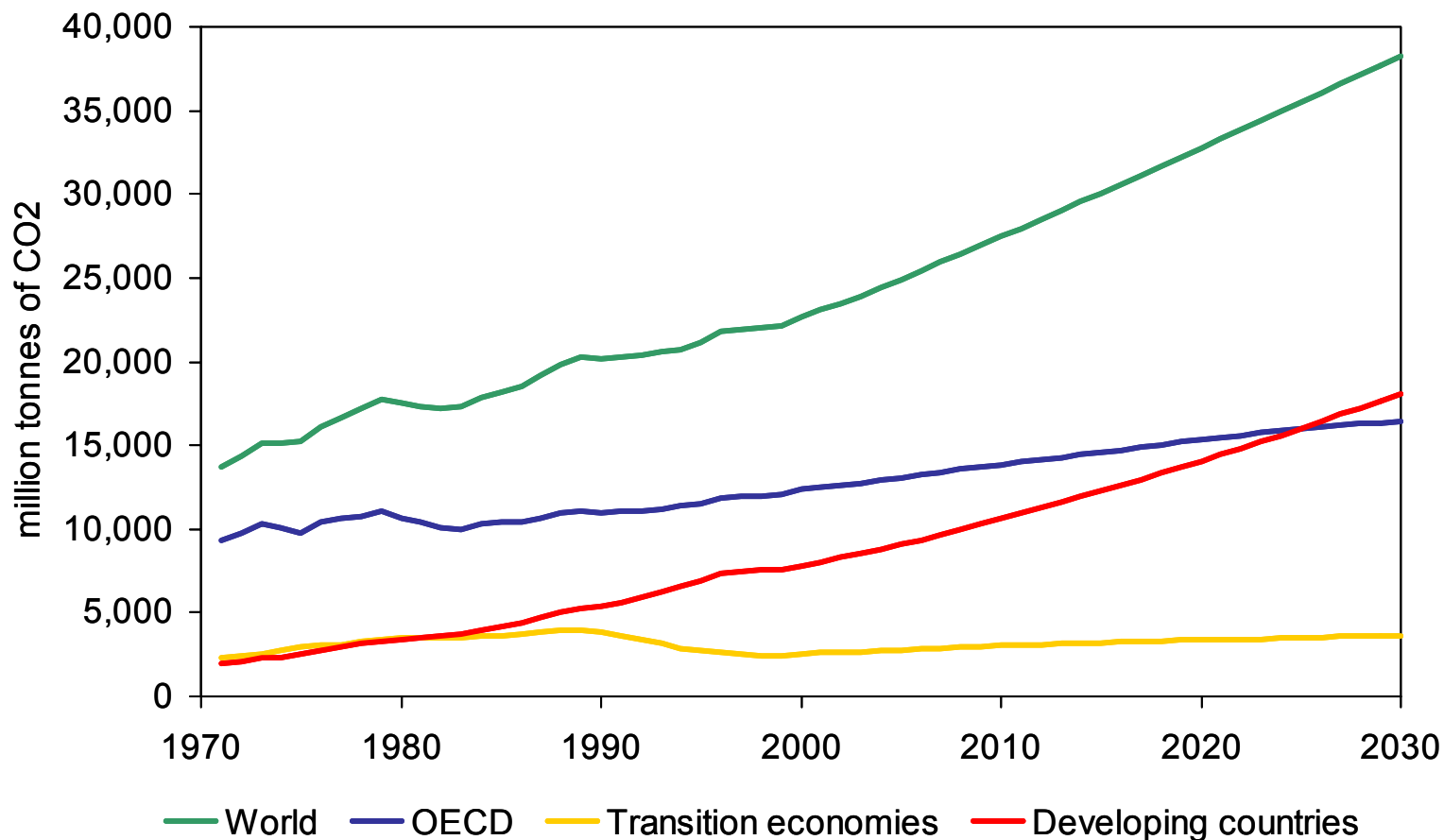
Developing Asia will become more dependent on oil & gas imports, from fewer countries – mainly Middle East and Russia.

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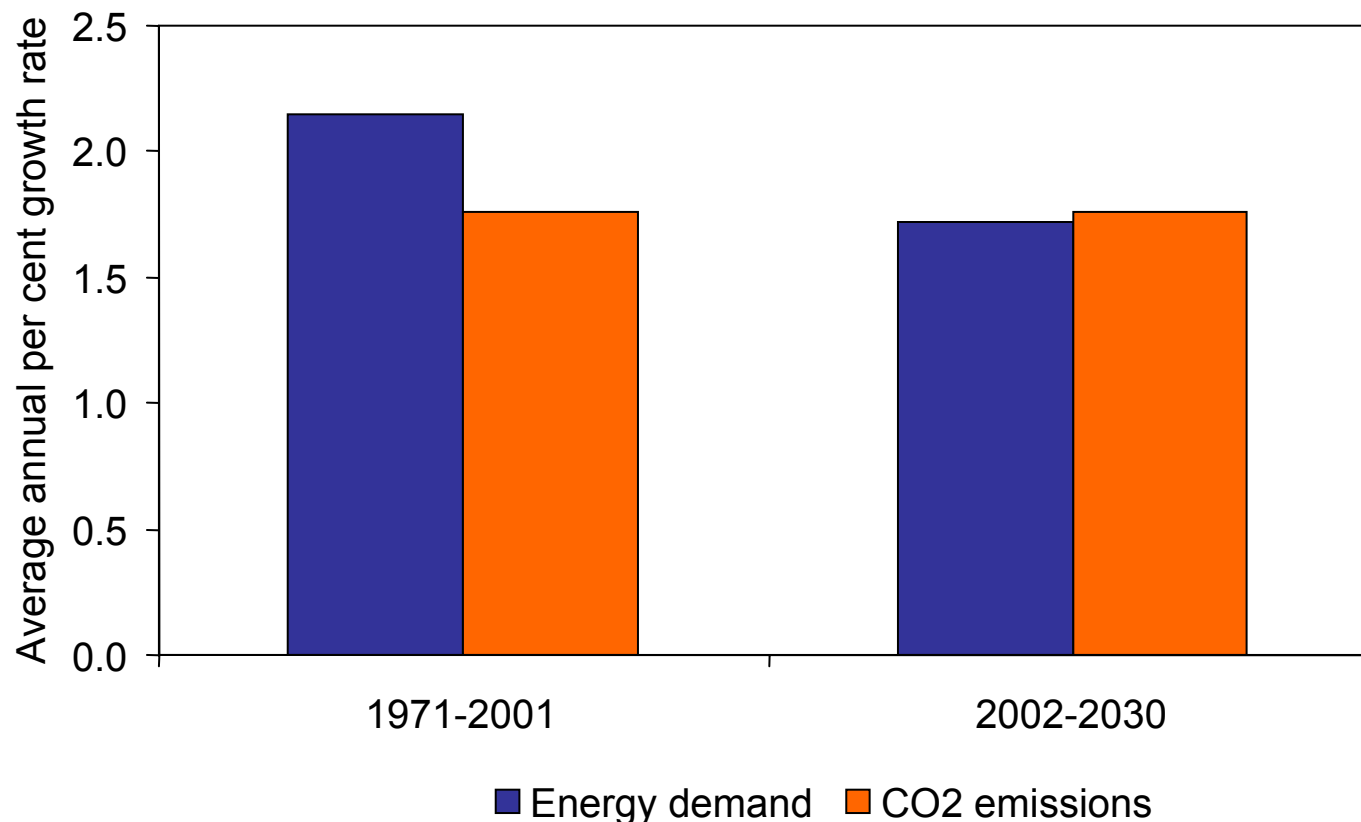


Energy-Related CO₂ Emissions



World emissions increase by 1.8 % per year to 38 billion tonnes in 2030 – 70% above 2000 levels

World Primary Energy Demand and CO₂ Emissions



Emissions increase faster than demand over the next 30 years, because the share of fossil fuels in the energy mix grows

WORLD
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INVESTMENT

OUTLOOK

2003
INSIGHTS

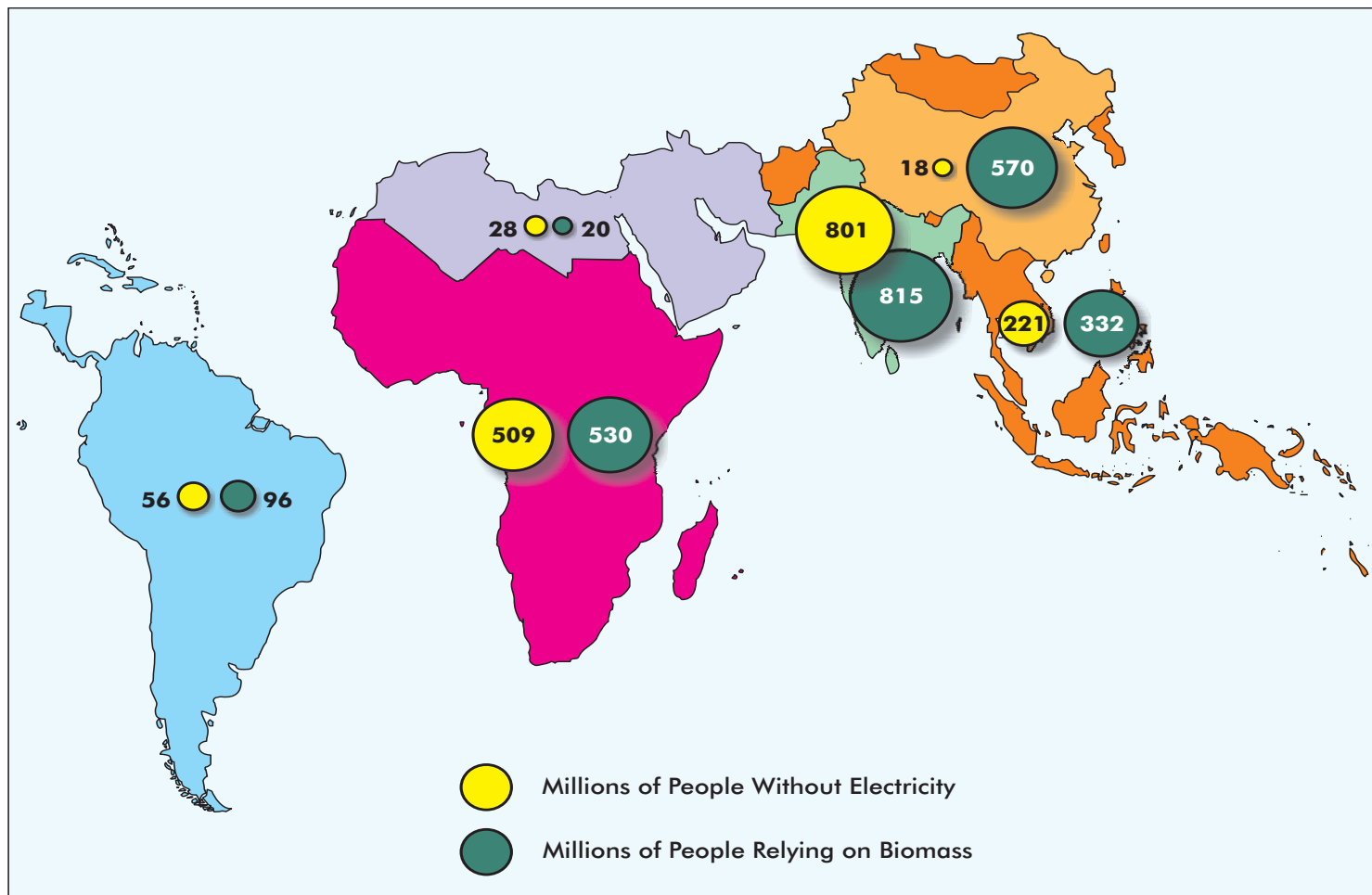


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Map of Global Energy Poverty



**1.6 billion people have no access to electricity,
80% of them in South Asia and sub-Saharan Africa**

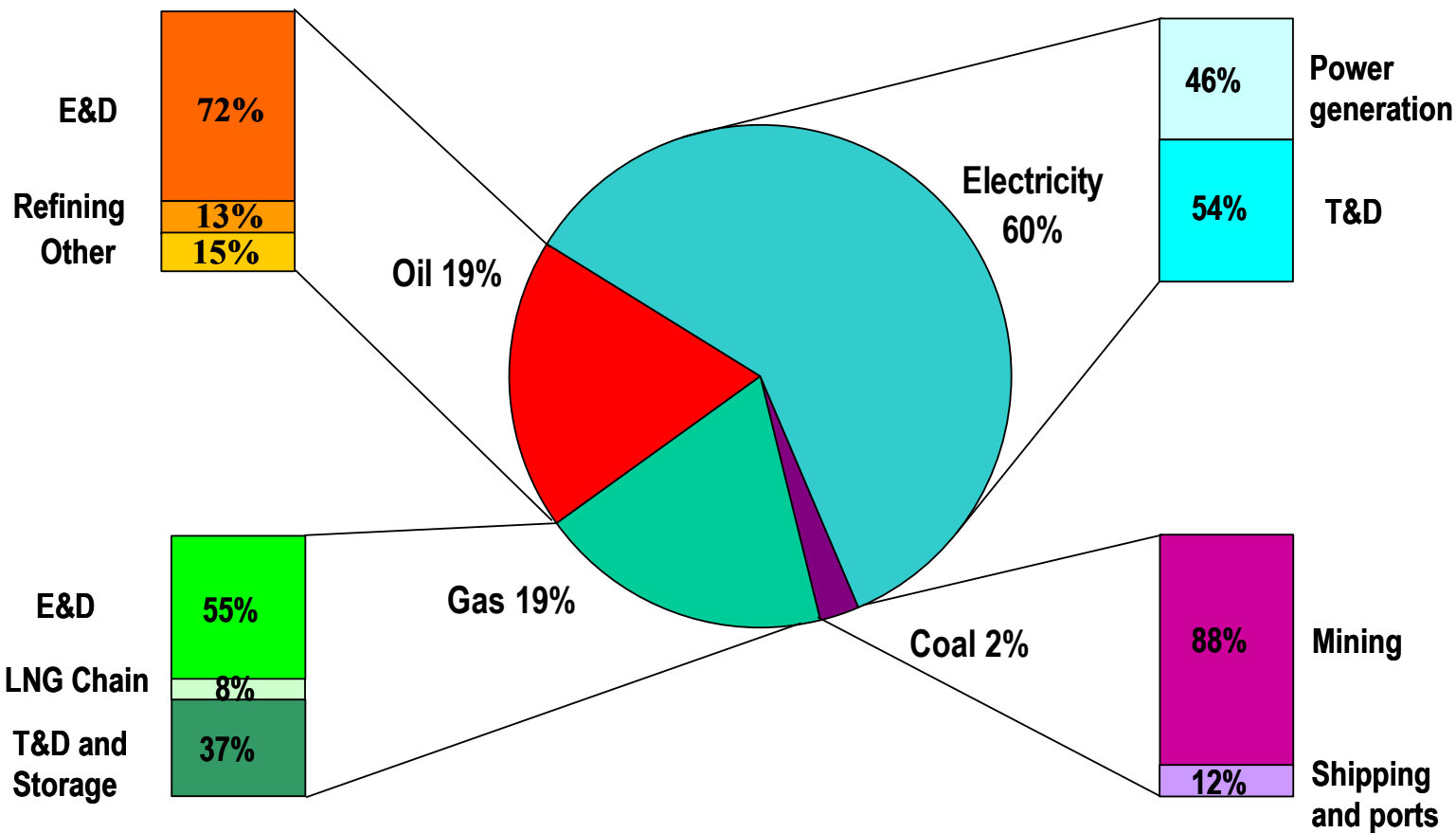
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World Energy Investment 2001-2030

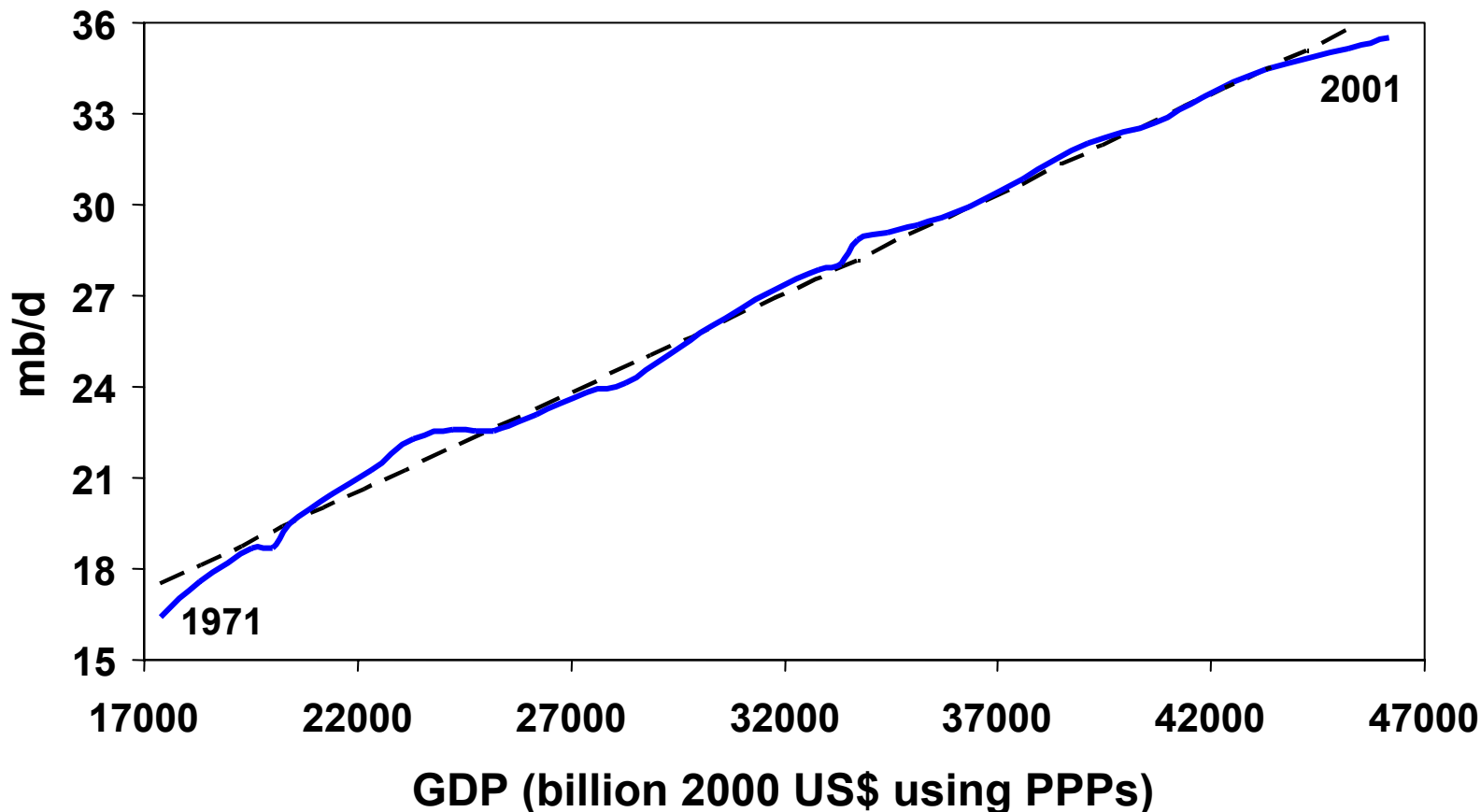
Total investment: 16 trillion dollars



Production accounts for the majority of investment in the supply chain – except for electricity

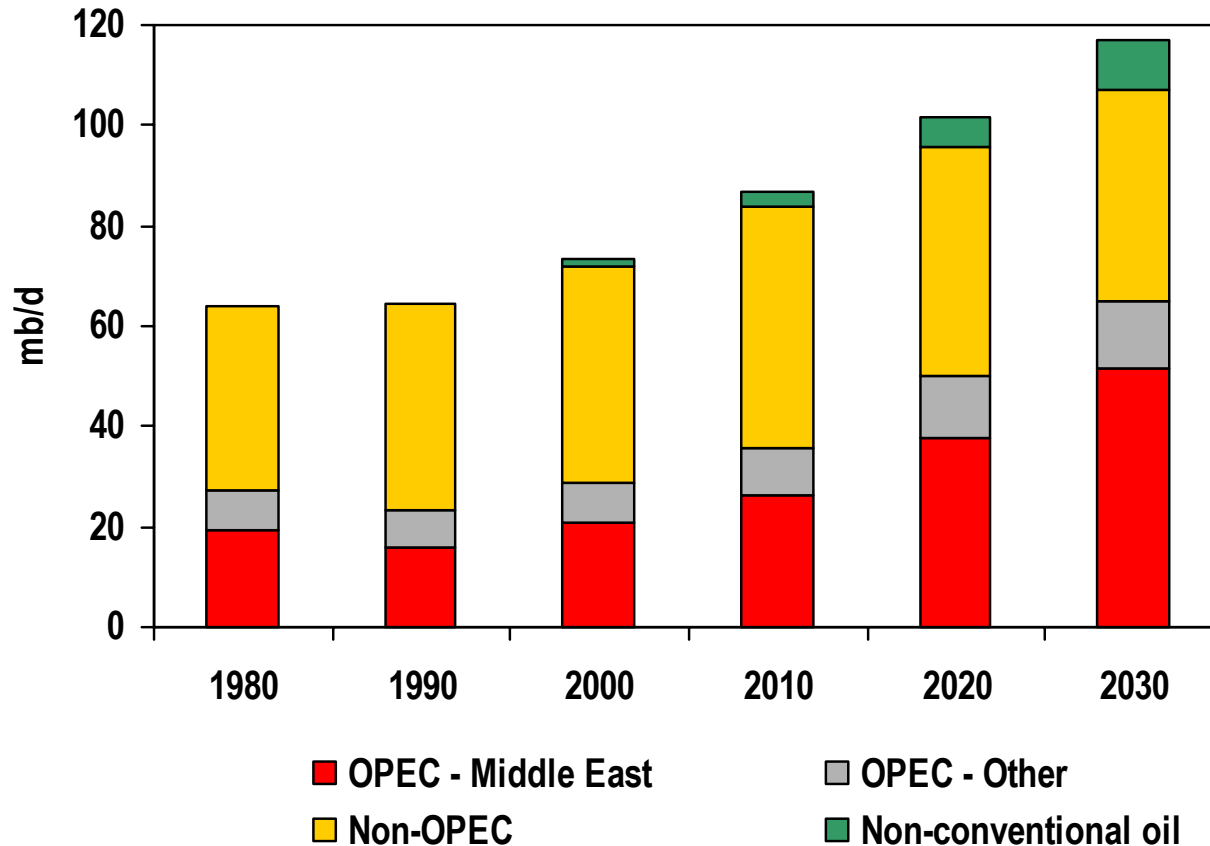


World Transportation Oil Demand



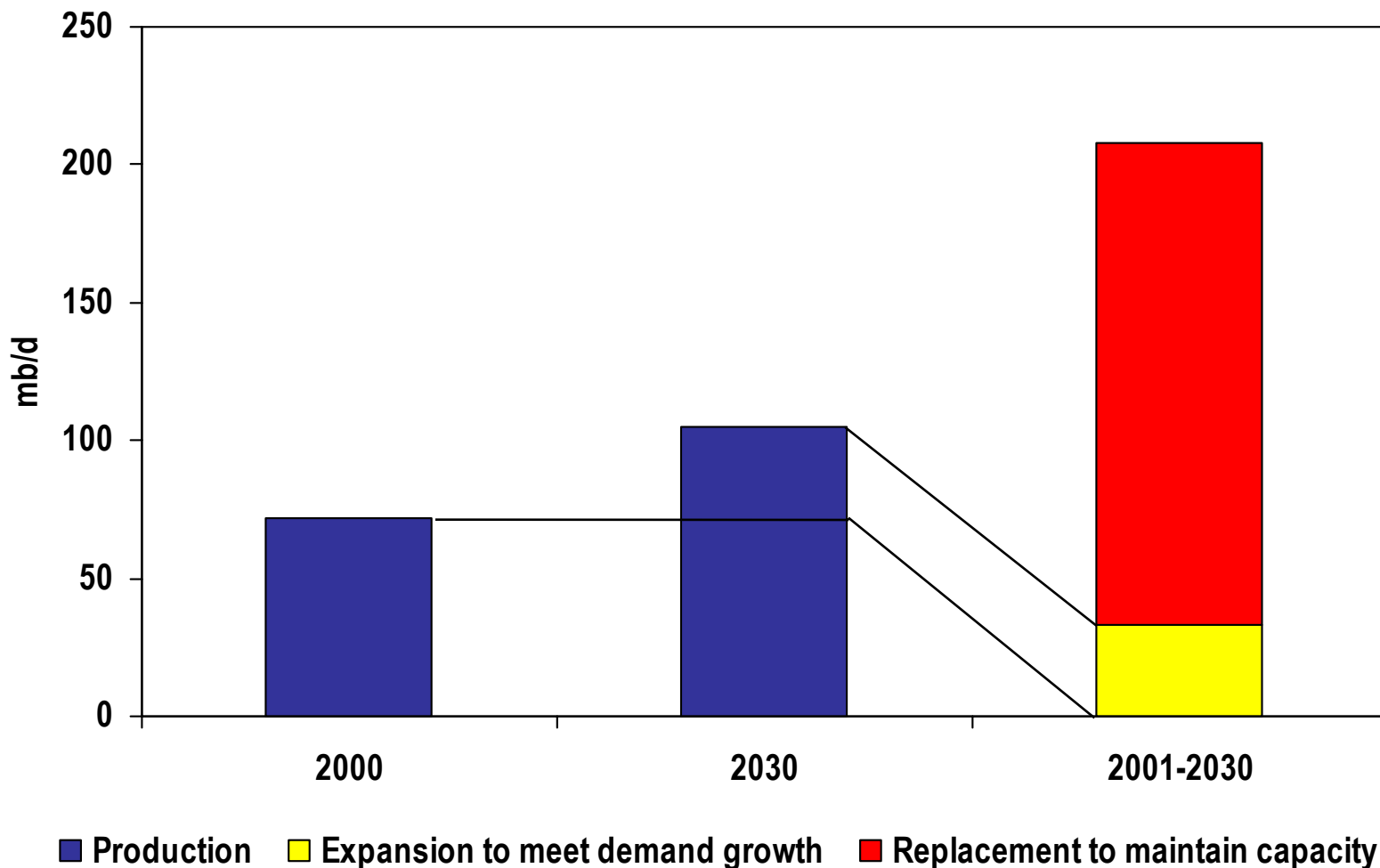
*Oil demand for transport increases very closely in line with
GDP in all regions*

World Oil Production



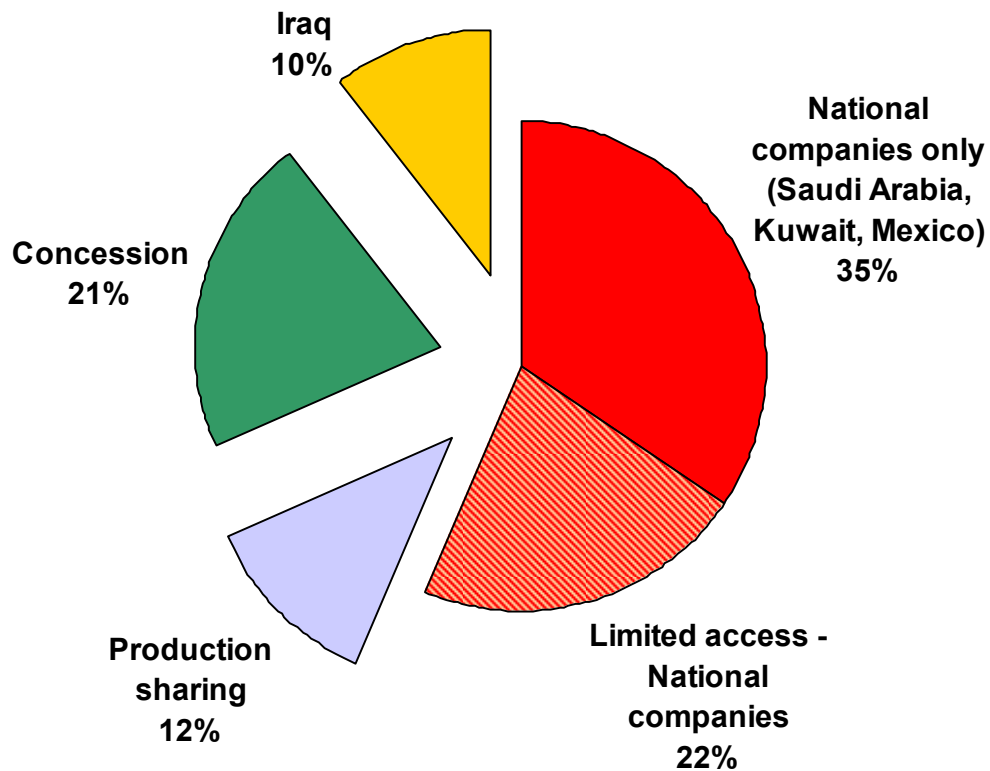
OPEC countries – mainly in Middle East – will account for bulk of the increase in world oil production to 2030

Oil Production and Capacity Additions



The bulk of additions to crude oil production capacity will be needed simply to maintain capacity

Access to Oil Reserves



1,032 billion barrels

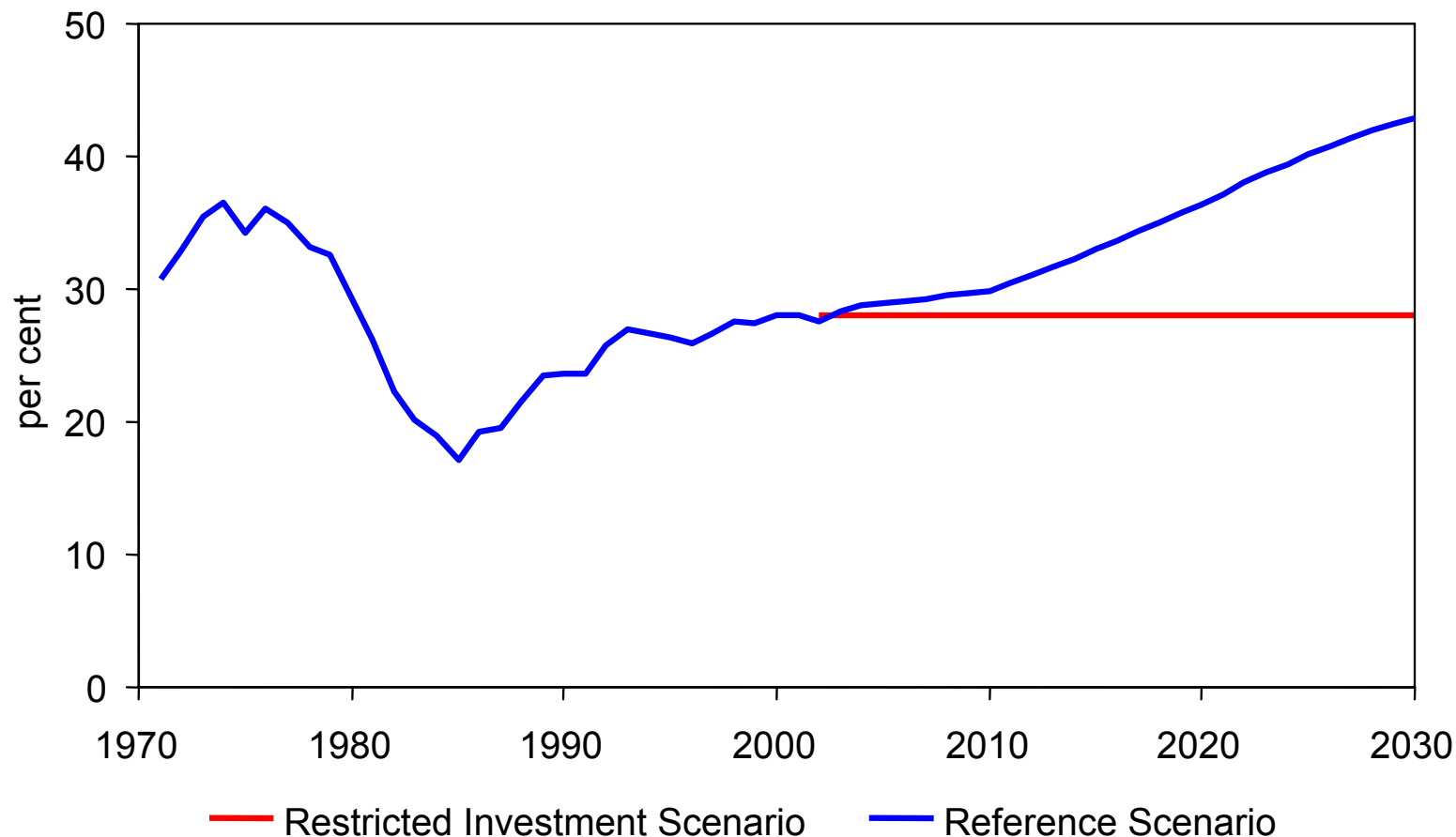
Access to much of the world's remaining oil reserves is restricted

Oil and Gas Reserves

- **Proven reserves are sufficient to meet demand for next three decades**
- **But considerable uncertainty over remaining probable and possible reserves**
- **Uncertainty is especially great in key producing countries**
- **Need for more transparent, consistent and comprehensive data is obvious**

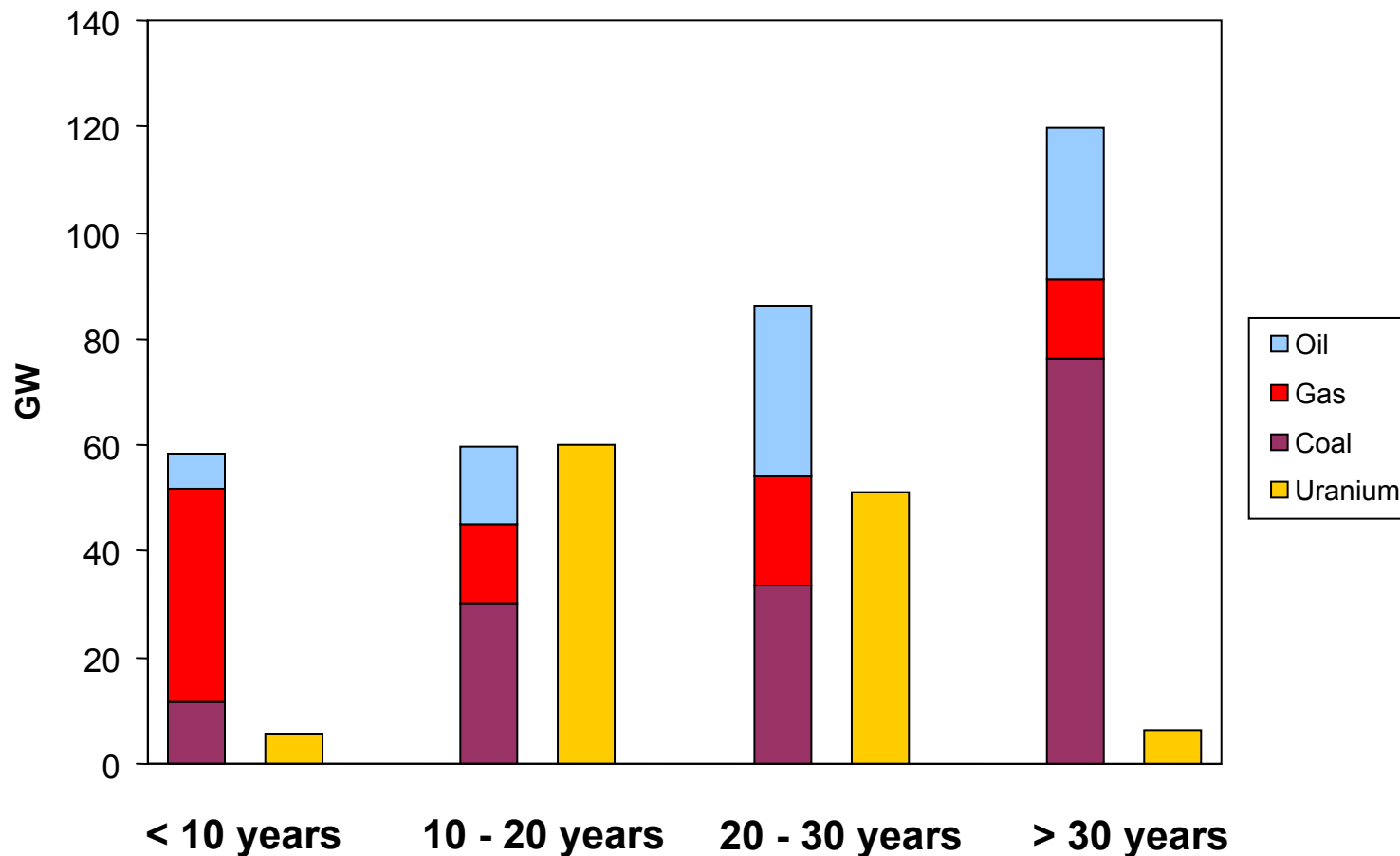
Restricted Middle East Oil Investment Scenario

OPEC Middle East Share in Global Oil Supply



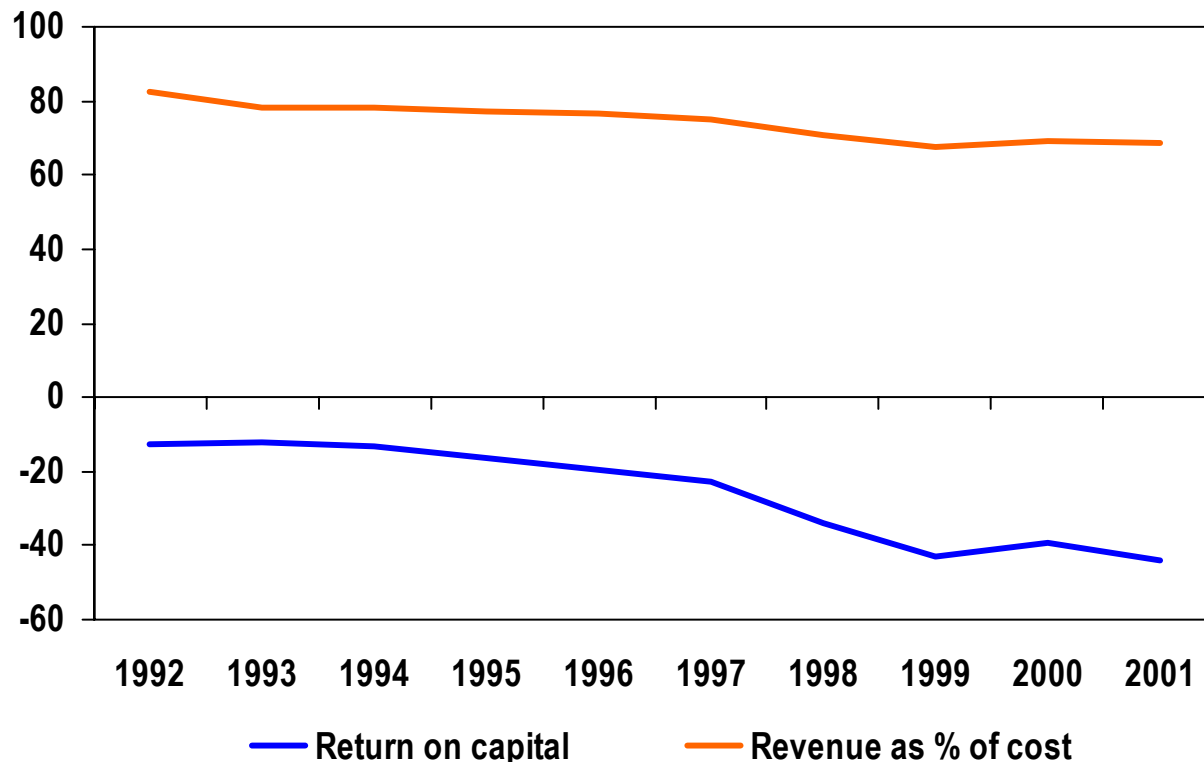
OPEC Middle East's share of global oil production is assumed to remain flat at under 30% in Restricted Investment Scenario

Age of Installed Capacity in EU-15



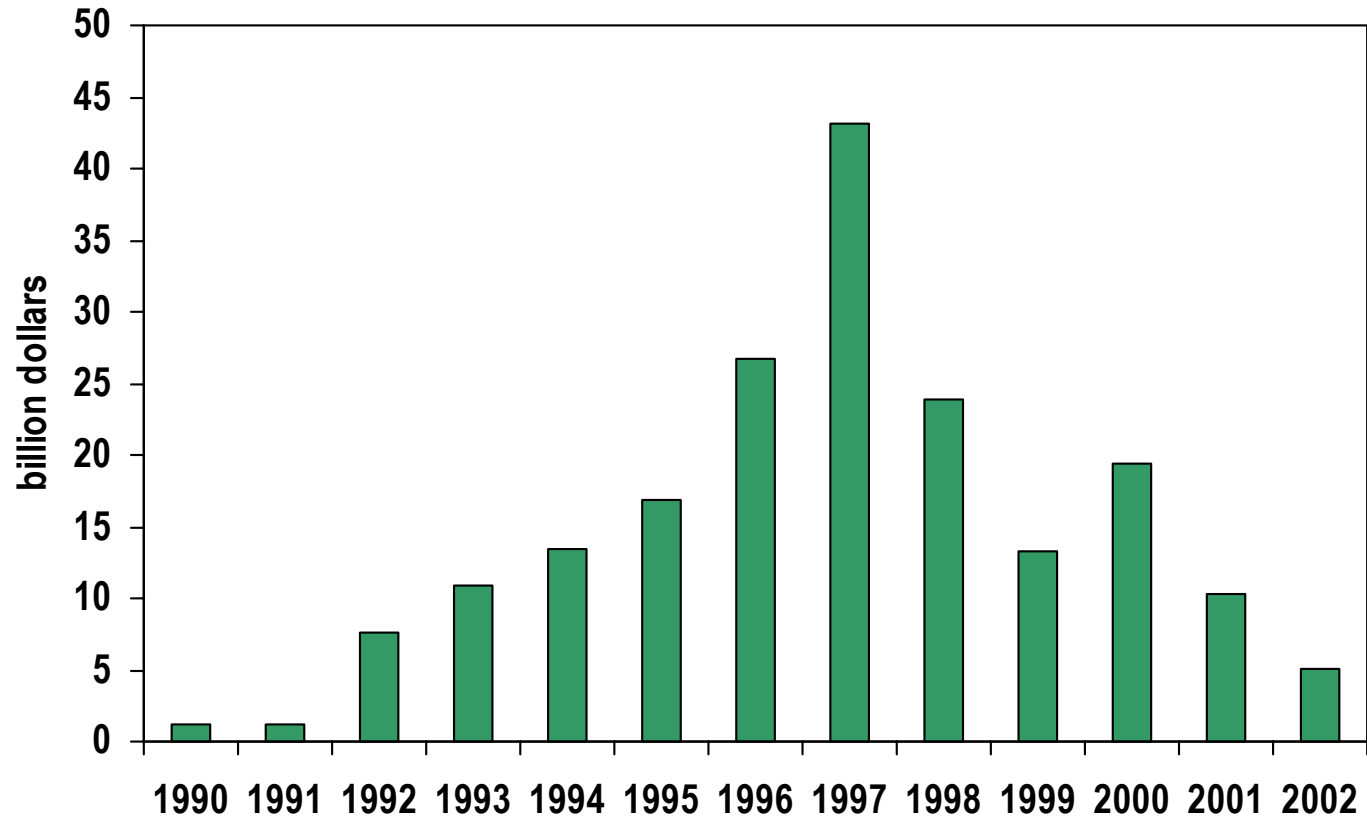
Europe's power plants are ageing: half current capacity - mostly coal-fired - could be retired before 2030

Electricity Revenue and Return on Capital of Indian SEBs



The desperate financial straits of Indian state electricity boards underlines the urgent need for pricing reform

Power Sector Private Investment in Developing Countries



Developing countries will need to reverse the slump in private capital flows if projected investment is to be forthcoming

Some concluding remarks...

- **Governments: less direct intervention as lender or owner – ‘facilitator’ role**
- **Policymakers need to ensure basic principles of good governance are applied and respected**
- **Fiscal and regulatory incentives for developing advanced technologies could speed their deployment and dramatically alter energy patterns**
- **Need for concerted international efforts**