



IEA
WORLD
ENERGY
INVESTMENT
OUTLOOK

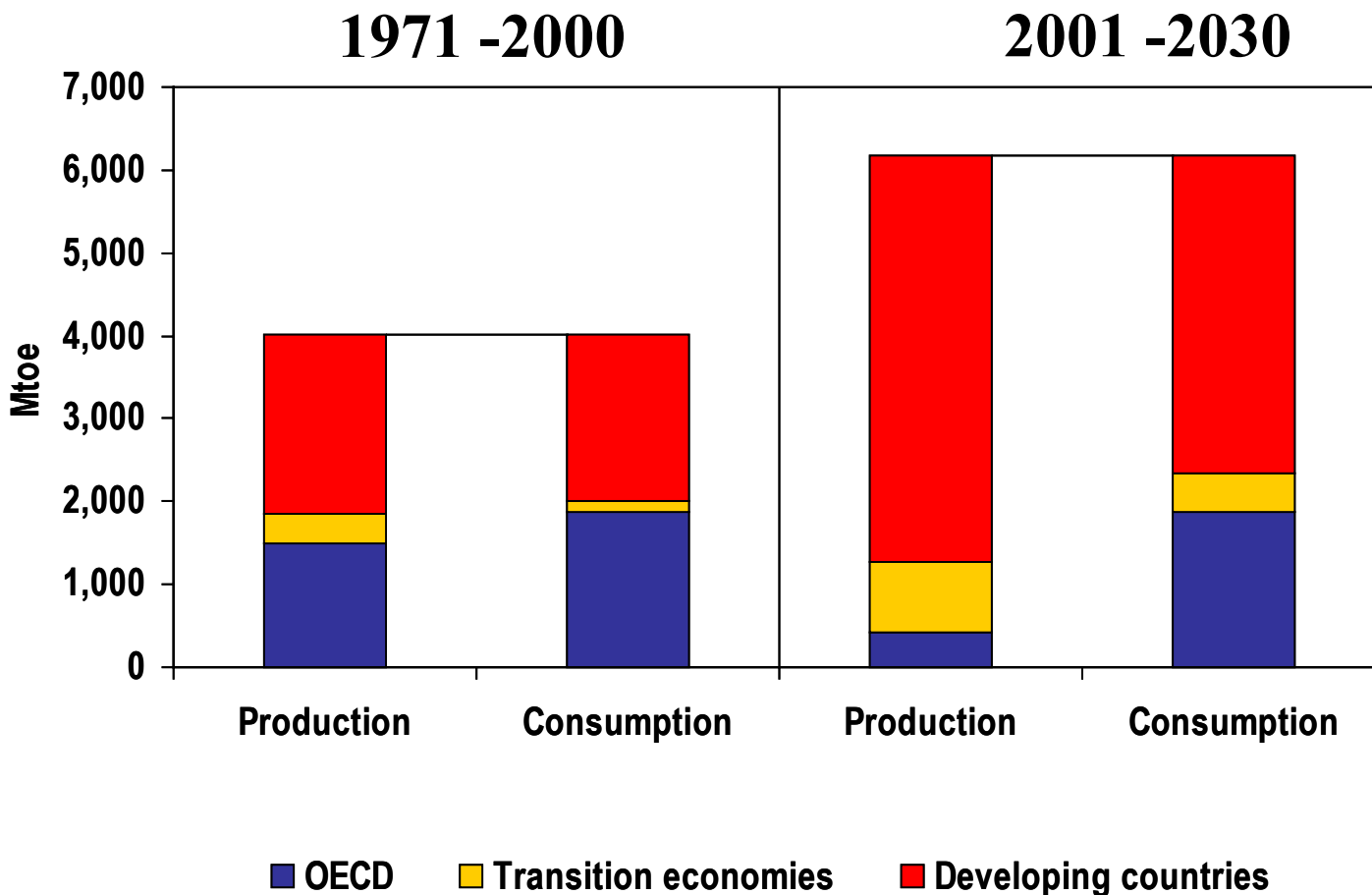
2003 INSIGHTS

Marianne Haug
Director, International Energy Agency

CSLF Meetings
Rome; 20-24 January 2004



Increase in World Energy Production and Consumption

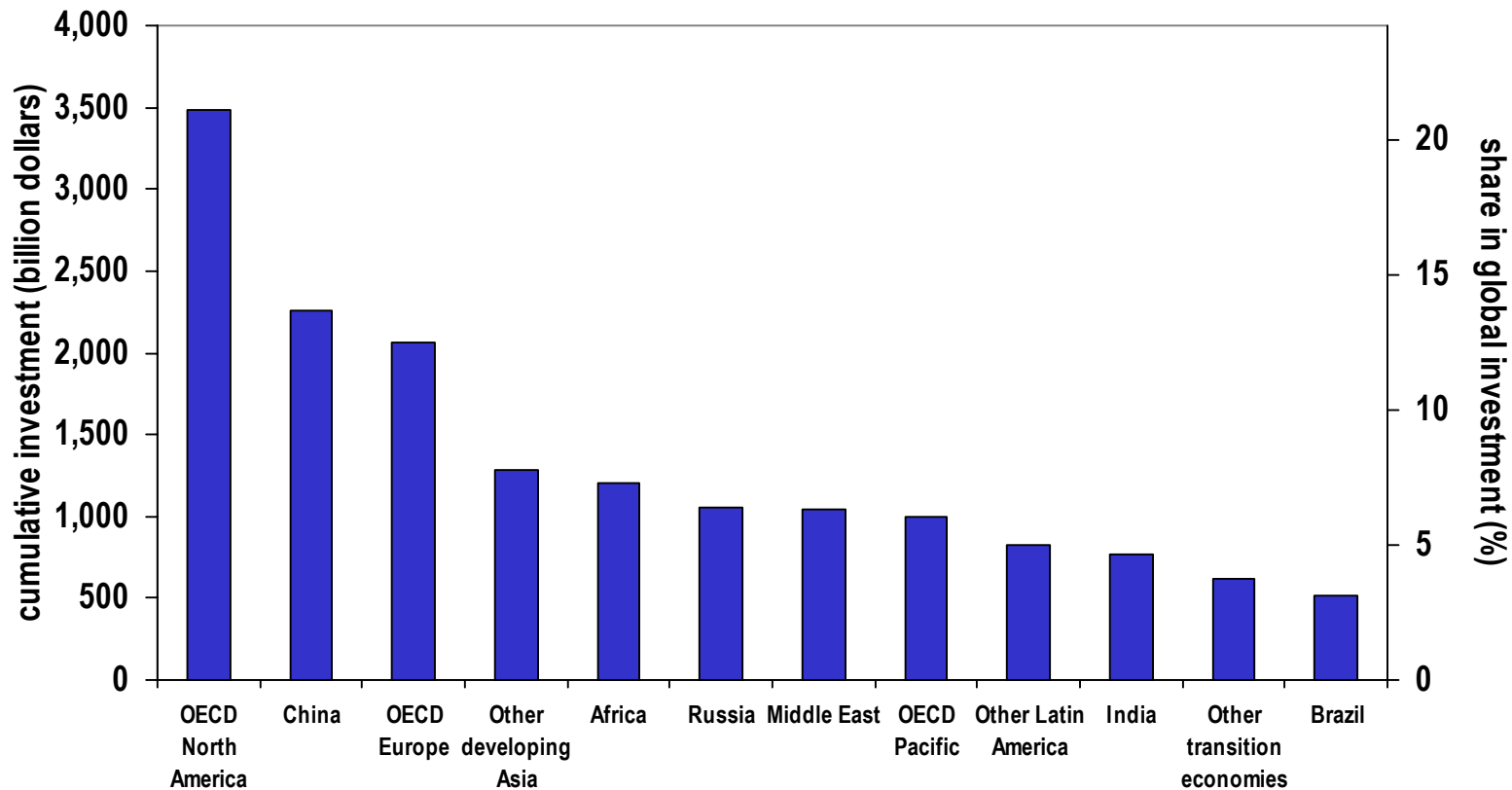


Almost all the increase in production occurs outside the OECD, compared with 60% in 1971-2000



Energy Investment by Region 2001-2030

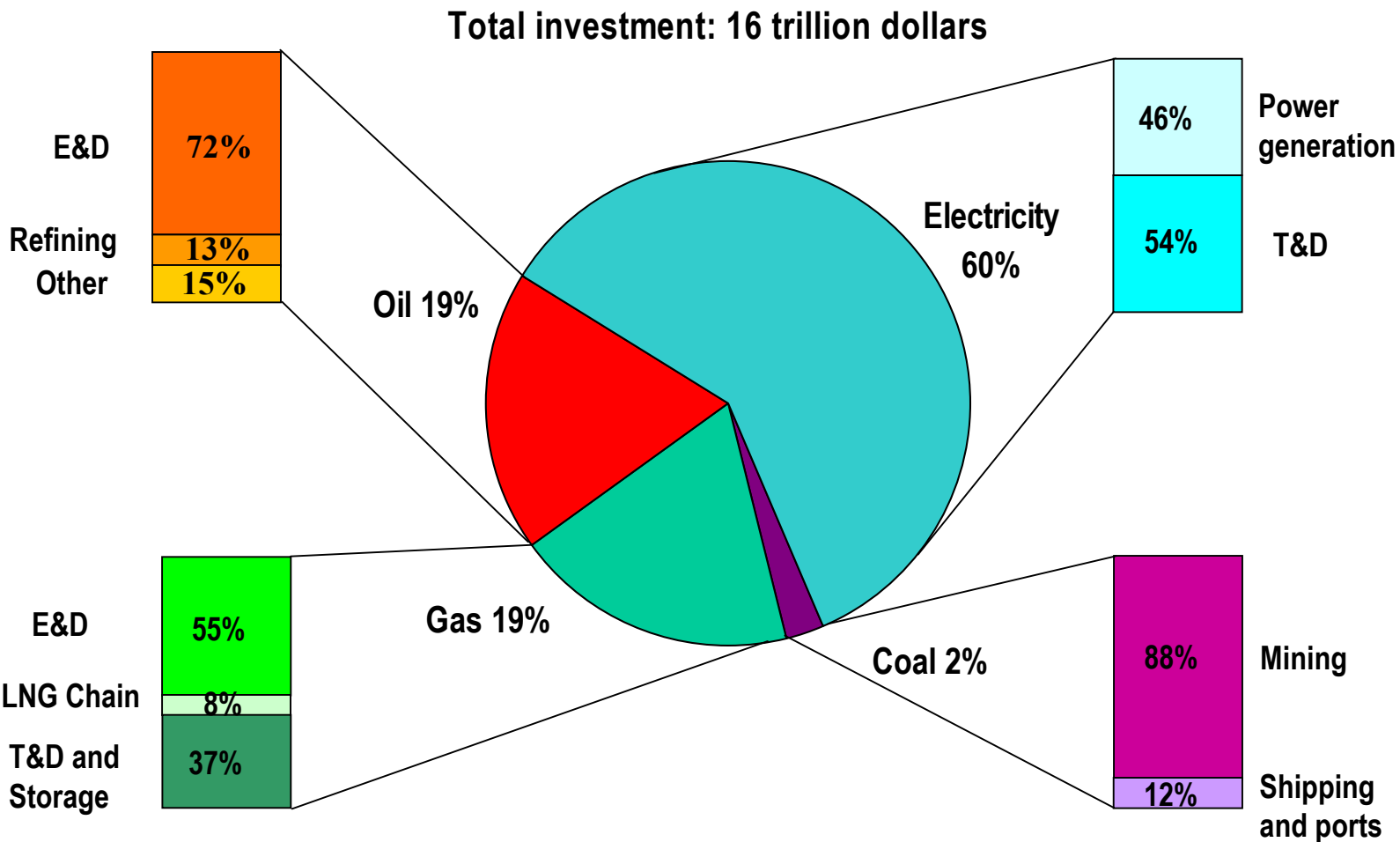
Total Investment: \$16 Trillion



**Almost half global energy investment will be needed in
developing countries**

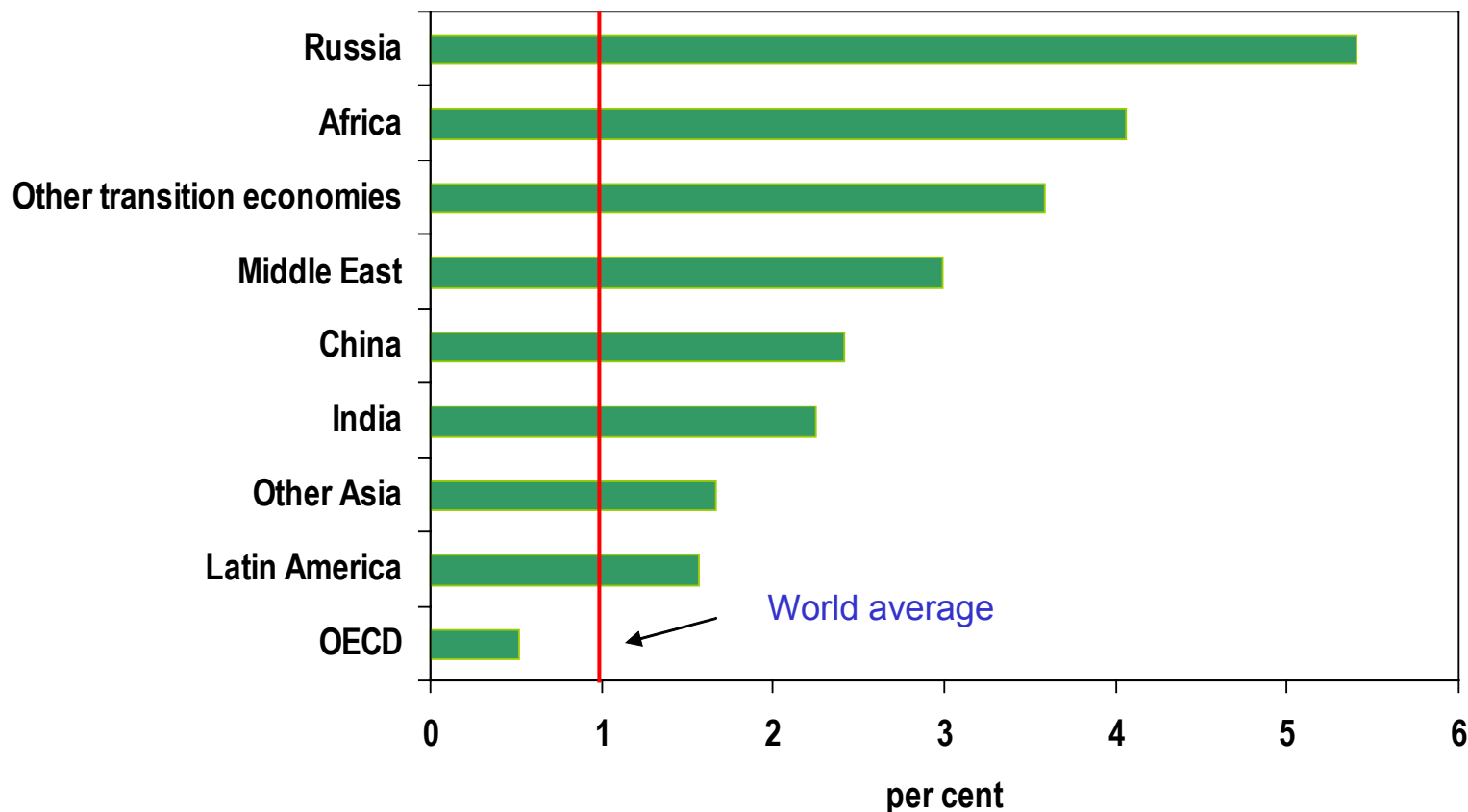


World Energy Investment 2001-2030



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

Energy Investment Share in GDP 2001-2030



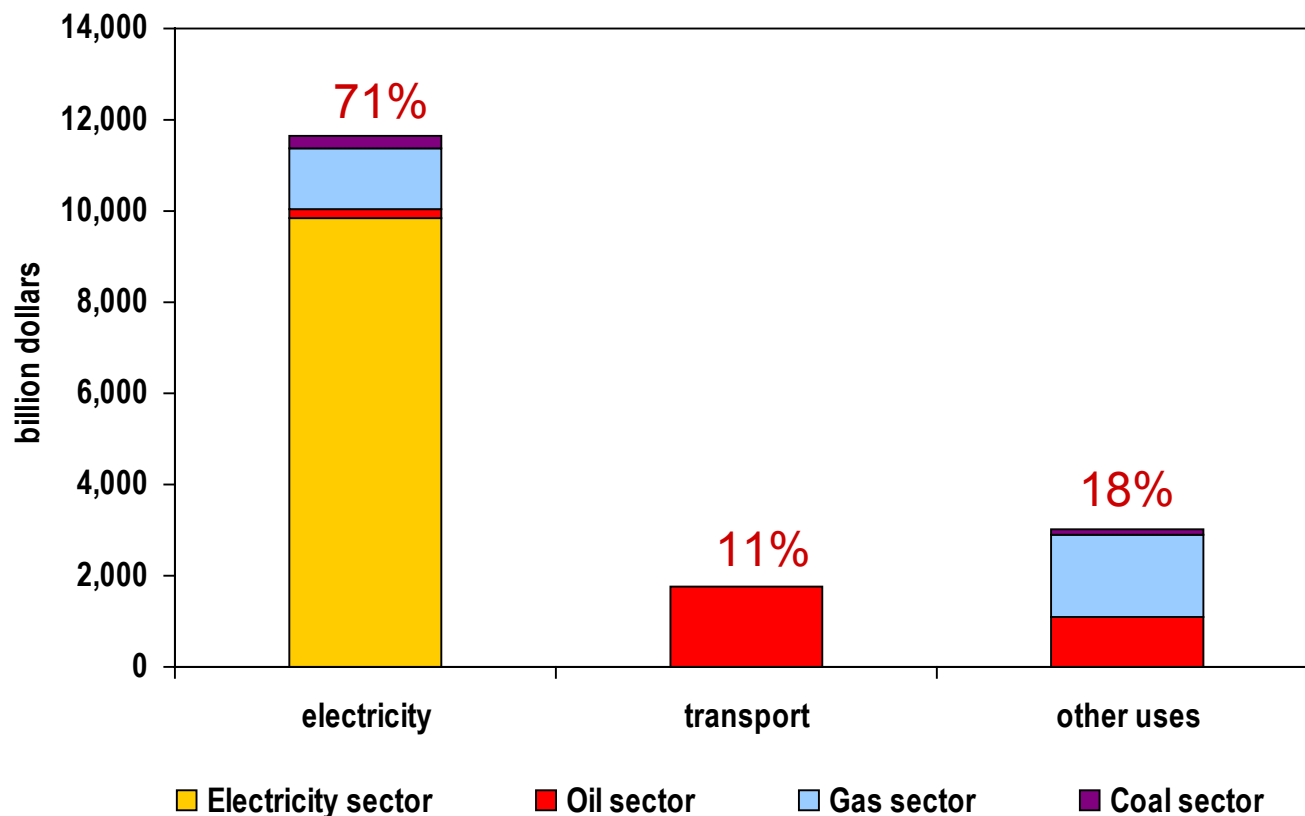
The share of energy investment in the economy is much higher in developing countries and the transition economies than in the OECD

Financing Energy Investment

- **Financing investment will be most difficult for the electricity sector in many non-OECD countries**
- **Attracting investment will be easier in the hydrocarbon sector**
- **Direct government intervention as lender or investor will continue to diminish**
- **But stronger role to set enabling conditions**
 - **Macroeconomic management**
 - **Financial sector development**
 - **Improvement of energy sector governance – including cost-reflective pricing**

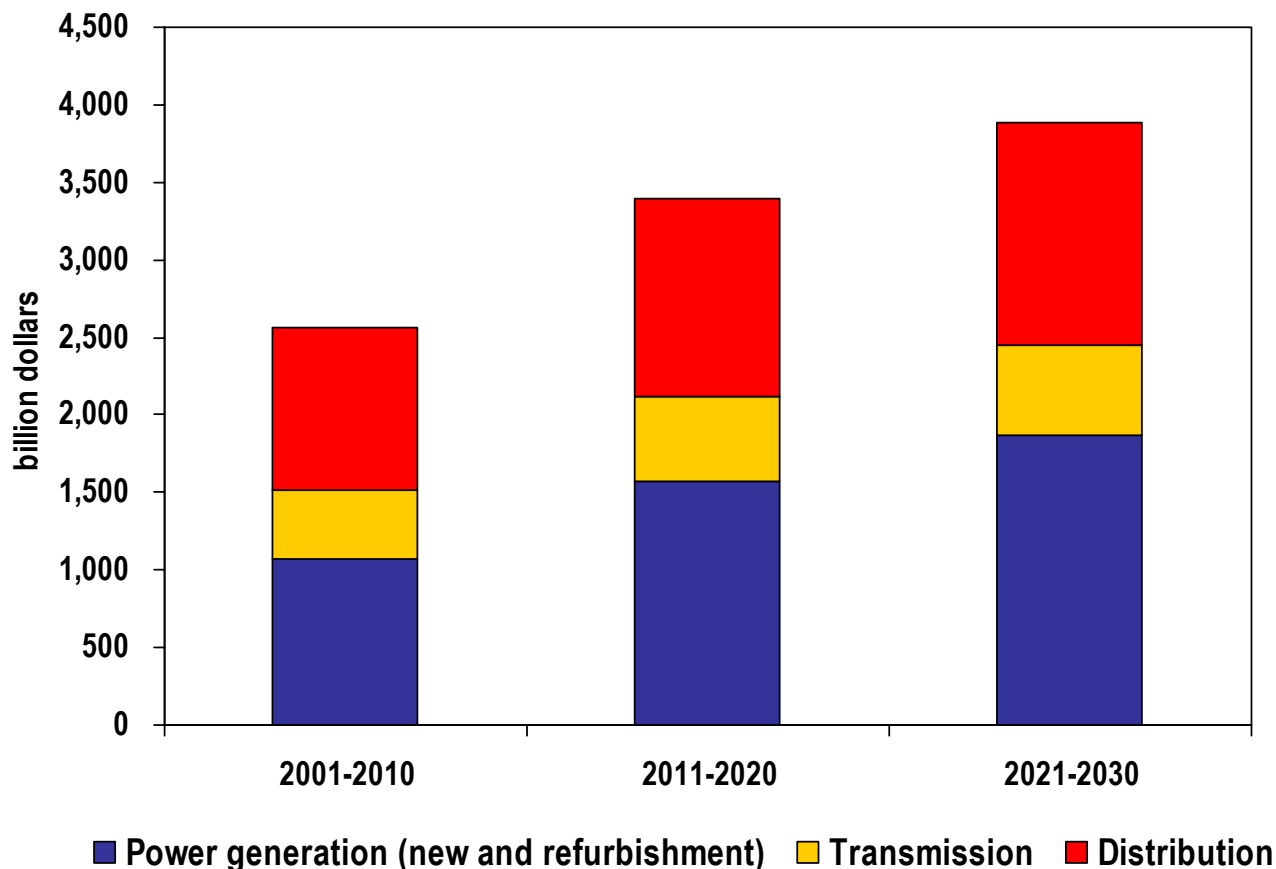


World Energy Investment by Energy Use 2001-2030



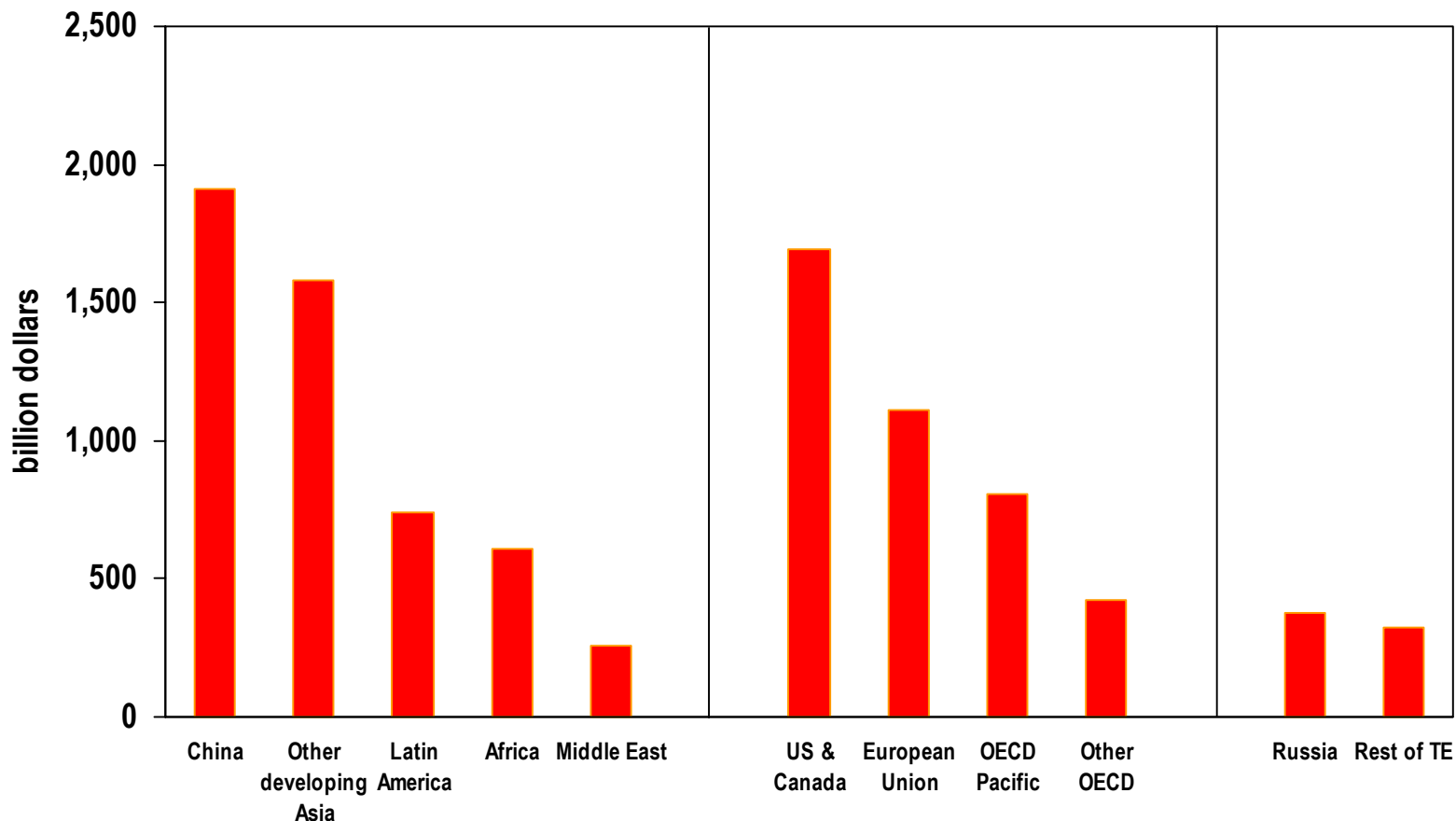
Electricity will account for most energy capital needs, especially if fossil-fuel supply to fuel power stations are included

World Electricity Sector Investment 2001-2030



Transmission and distribution networks will account for well over half of electricity-sector investment

Electricity Sector Investment by Region 2001-2030



China will need more electricity investment than any other country or region

OECD Electricity Investment Challenges

- **Competition/Liberalisation changes investment**
 - *No more central planning of generation investment*
 - *Multiple investors*
- **Generation investment levels adequate but uncertain; underinvestment in transmission**
- **Recent blackouts have underscored needs**
 - *Reforming approval processes*
- **Distributed generation will help**
 - *Already important in developing countries with unreliable central systems*

Electricity Investment Challenges in Developing Countries

- **Almost \$6 trillion needed (2001-2030) – far more than in past 3 decades**
- **Financing this will be challenging – especially in Africa and India**
- **Realising this investment will call for**
 - **More rigorous sector reforms – notably more cost-reflective pricing and improved collection**
 - **More stable and predictable investment regimes**
 - **Better corporate governance**
 - **Development of domestic financial markets**
 - **Stronger incentives for private and foreign investors**
- **660 million needed for Universal Electricity Access**

OECD Alternative Policy Scenario

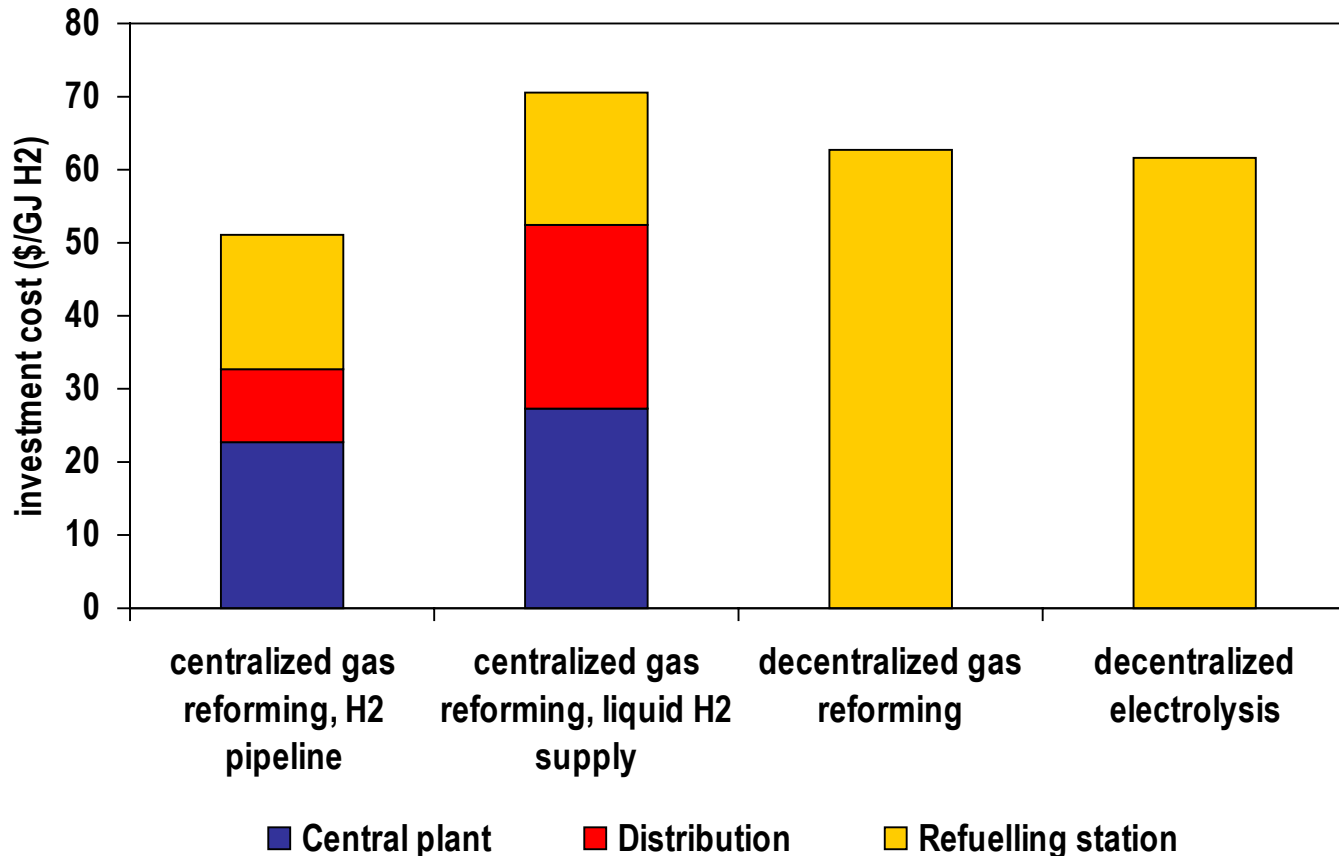
- **Models policies currently under consideration in OECD to cut greenhouse-gas emissions and save energy**
 - **Increased support to renewables**
 - **Increased combined heat and power**
 - **Improved energy efficiency**
- **OECD primary energy use is 9% lower and emissions 16% lower in 2030**
- **Results largely from 11% drop in electricity demand and switching from fossil fuels to renewables in generation**
- **Major implications for amount of investment needed and allocation of investment along supply chain**



Additional Policies and Technologies to Significantly Reduce Co₂

- **CO₂ Sequestration**
- **Hydrogen/fuel cells**
- **Advanced electricity transmission and distribution technologies**
- **Advanced nuclear reactors**

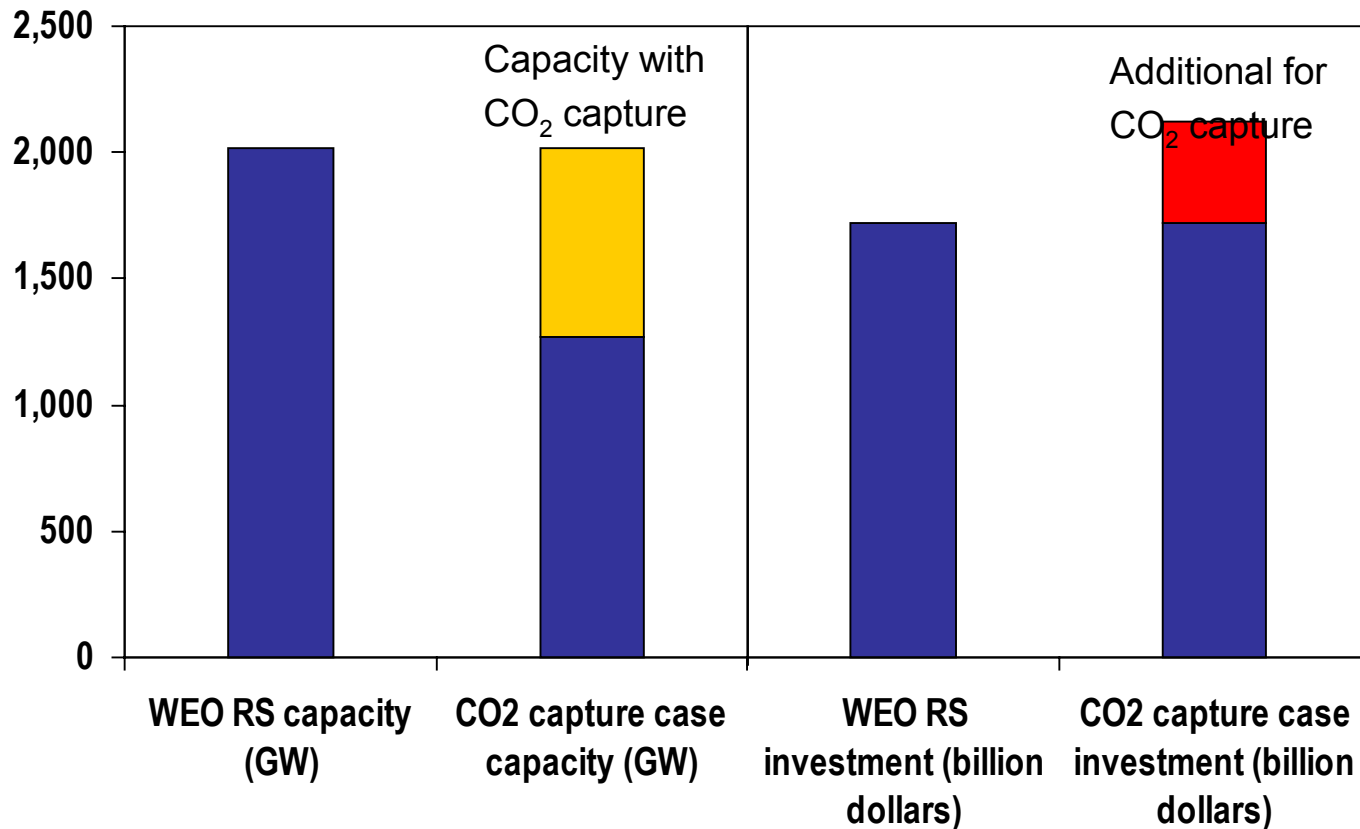
Investment Costs for Hydrogen Production & Supply Systems



Hydrogen can be produced and distributed to motor vehicles in different ways with different investment cost implications



Carbon Sequestration Scenario 2001-2030



Carbon-capture technologies can sequester 3 Gt of CO₂ in the OECD by 2030

Summary Conclusions

- **Total investment requirements are modest relative to world GDP, but challenge differs by region**
- **Energy and financial resources are sufficient, but increasing competition for capital and higher risk**
- **Capital needs are largest for electricity**
- **Half total energy investment is needed in developing countries – where financing will be hardest**
- **Production accounts for the bulk of investment – more than half just to replace old capacity**
- **Incentives to develop advanced technologies could speed their deployment and dramatically alter energy investment patterns to 2030**