

WORLD ENERGY INVESTMENT OUTLOOK

Asia-Pacific Energy Investment Challenges

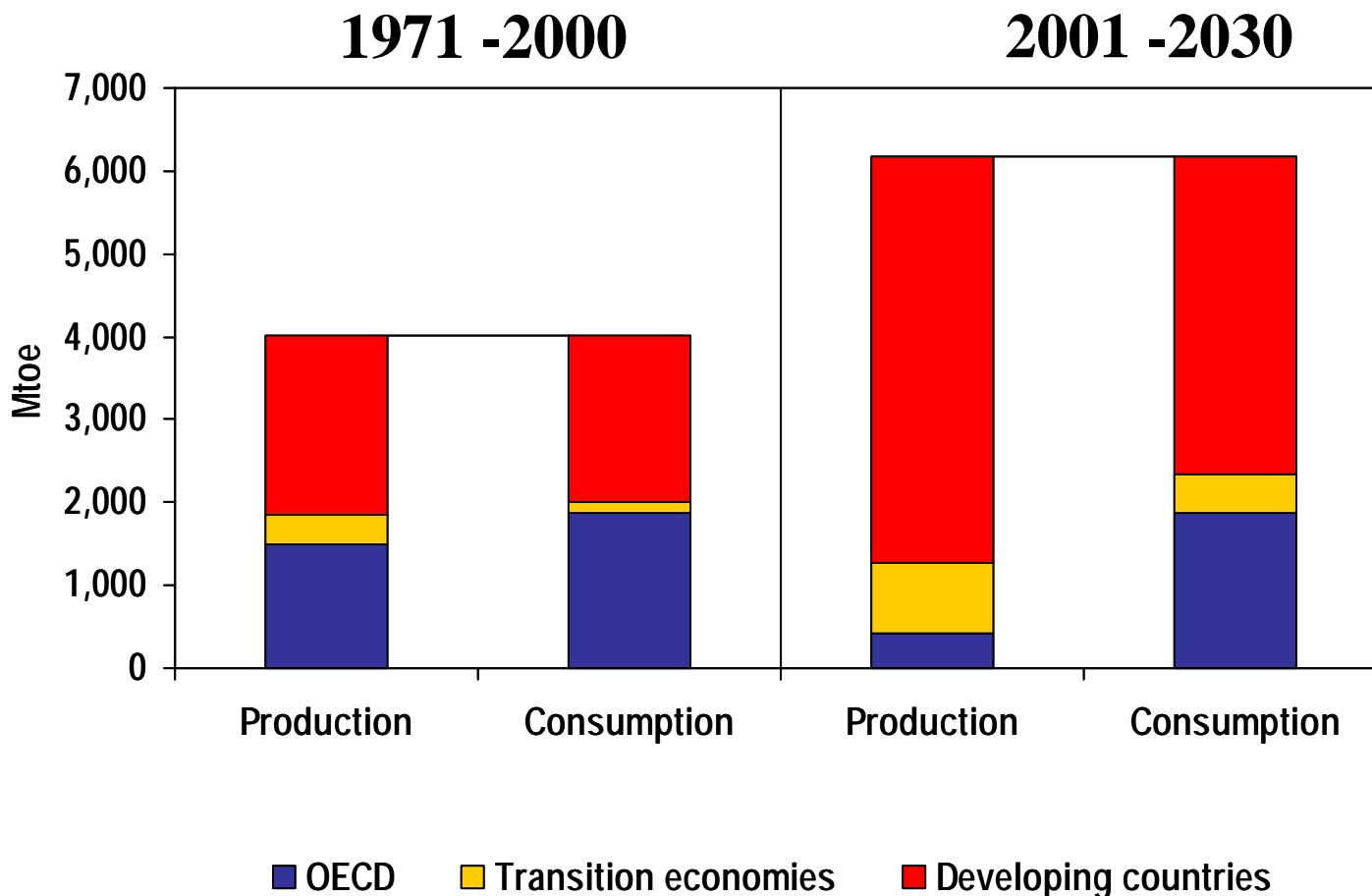
2003 INSIGHTS

Claude Mandil, Executive Director of IEA

IEEJ Seminar in Tokyo, Japan

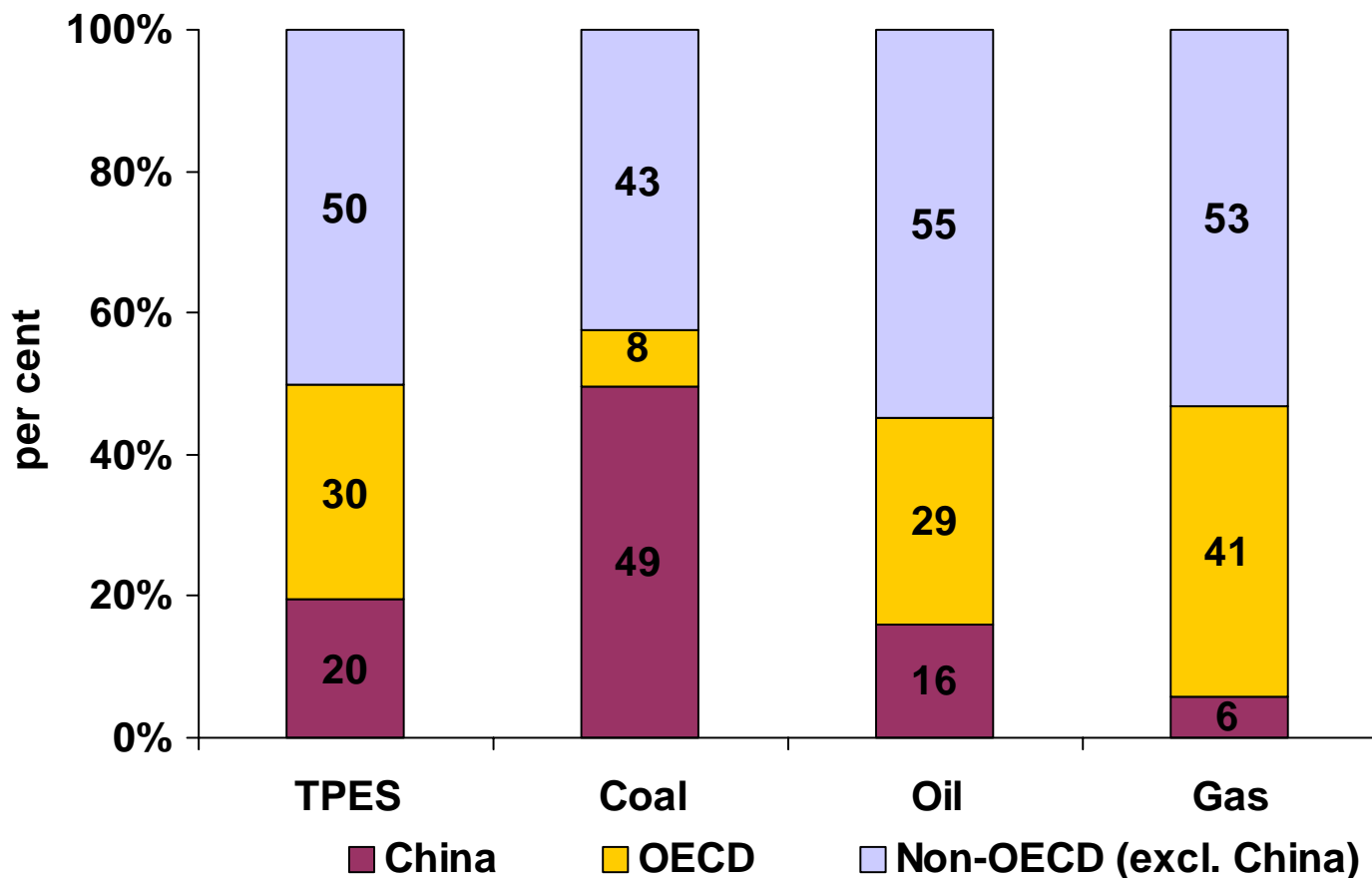
November 18, 2003

Increase in World Energy Production and Consumption



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

Share of China in World Incremental Energy Demand 2000-2030



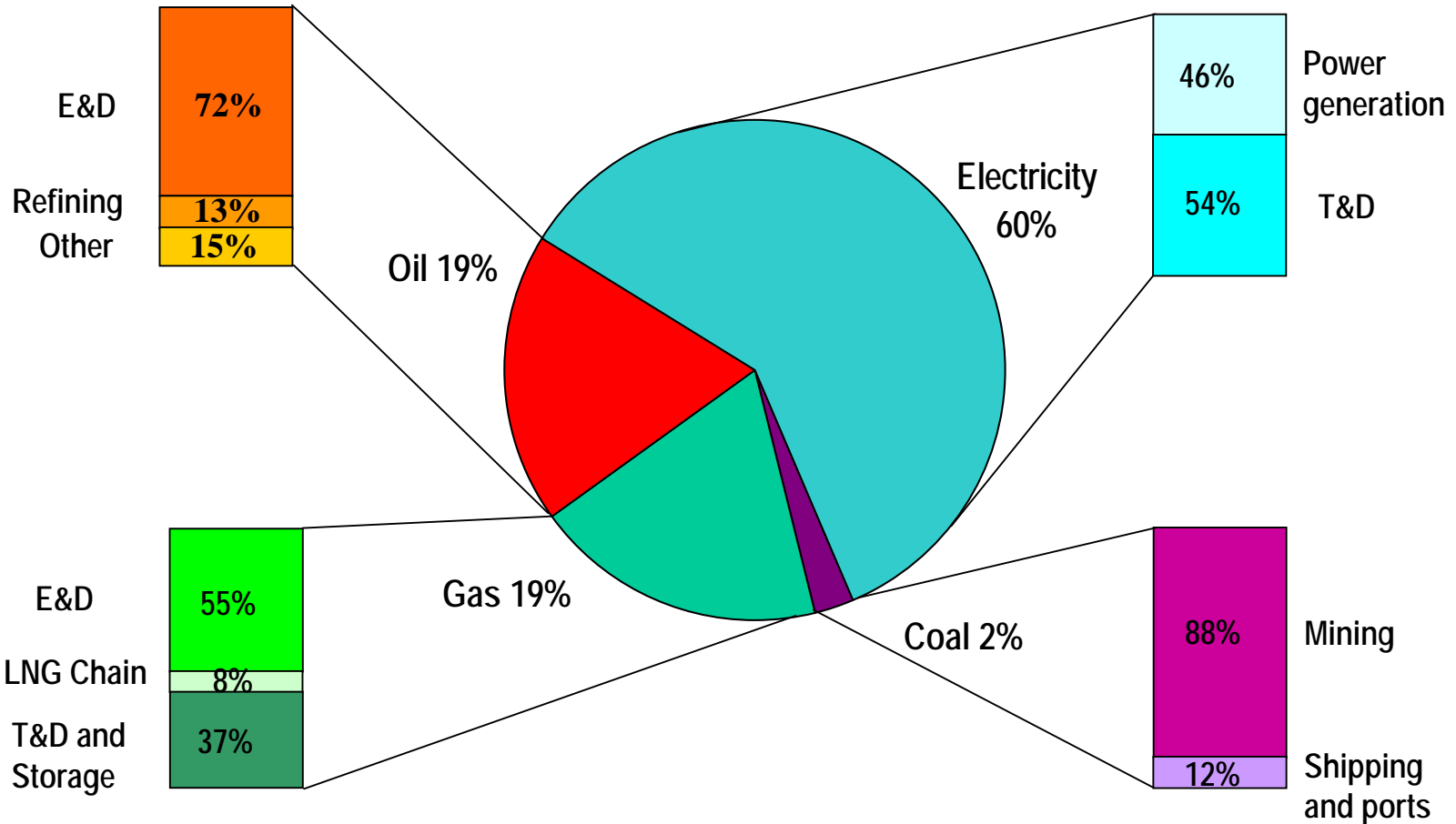
China will account for 20% of world incremental energy demand and for half of the increase in coal use over the next three decades



World Energy Investment

2001-2030

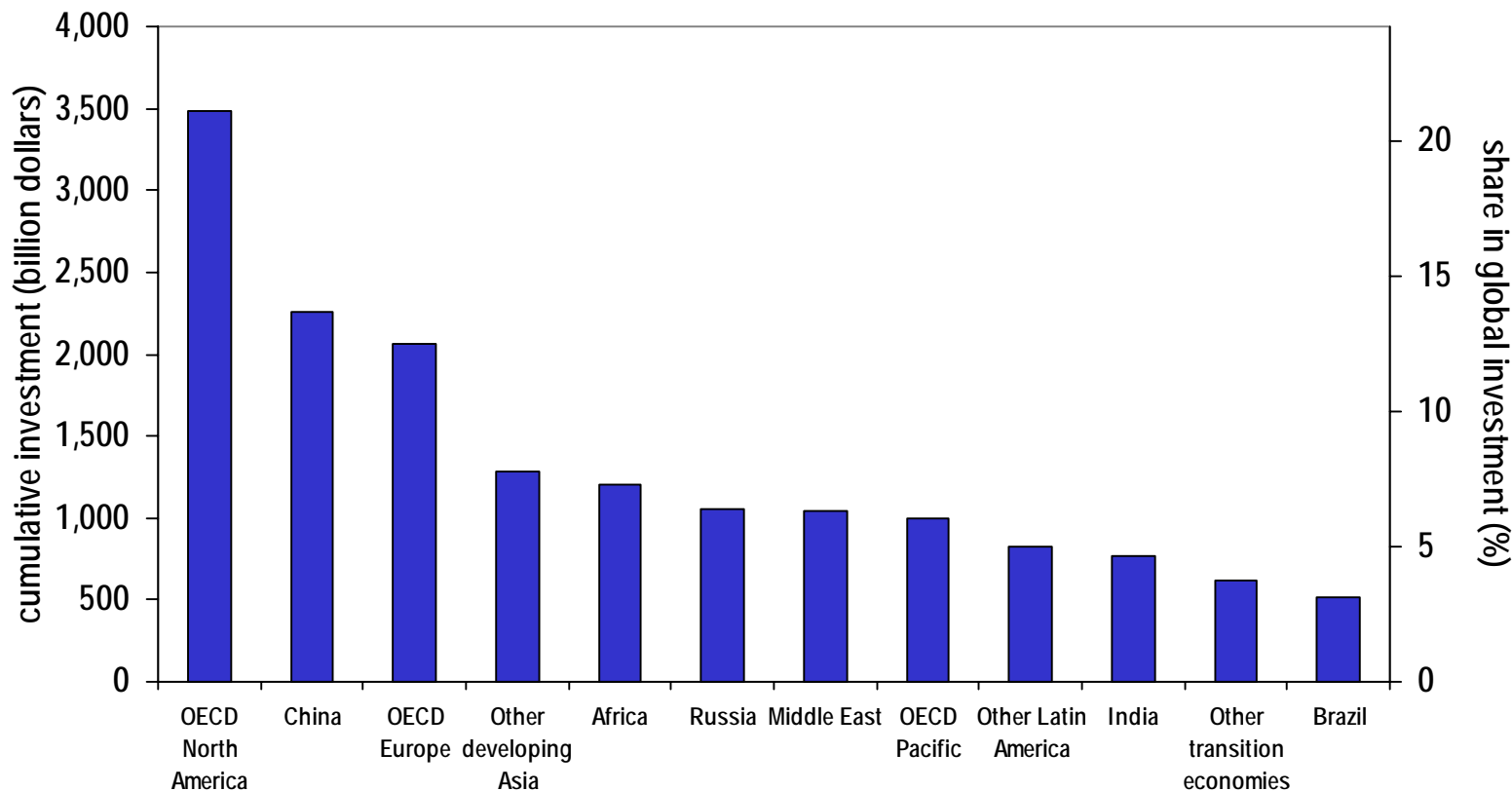
Total investment: 16 trillion dollars



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

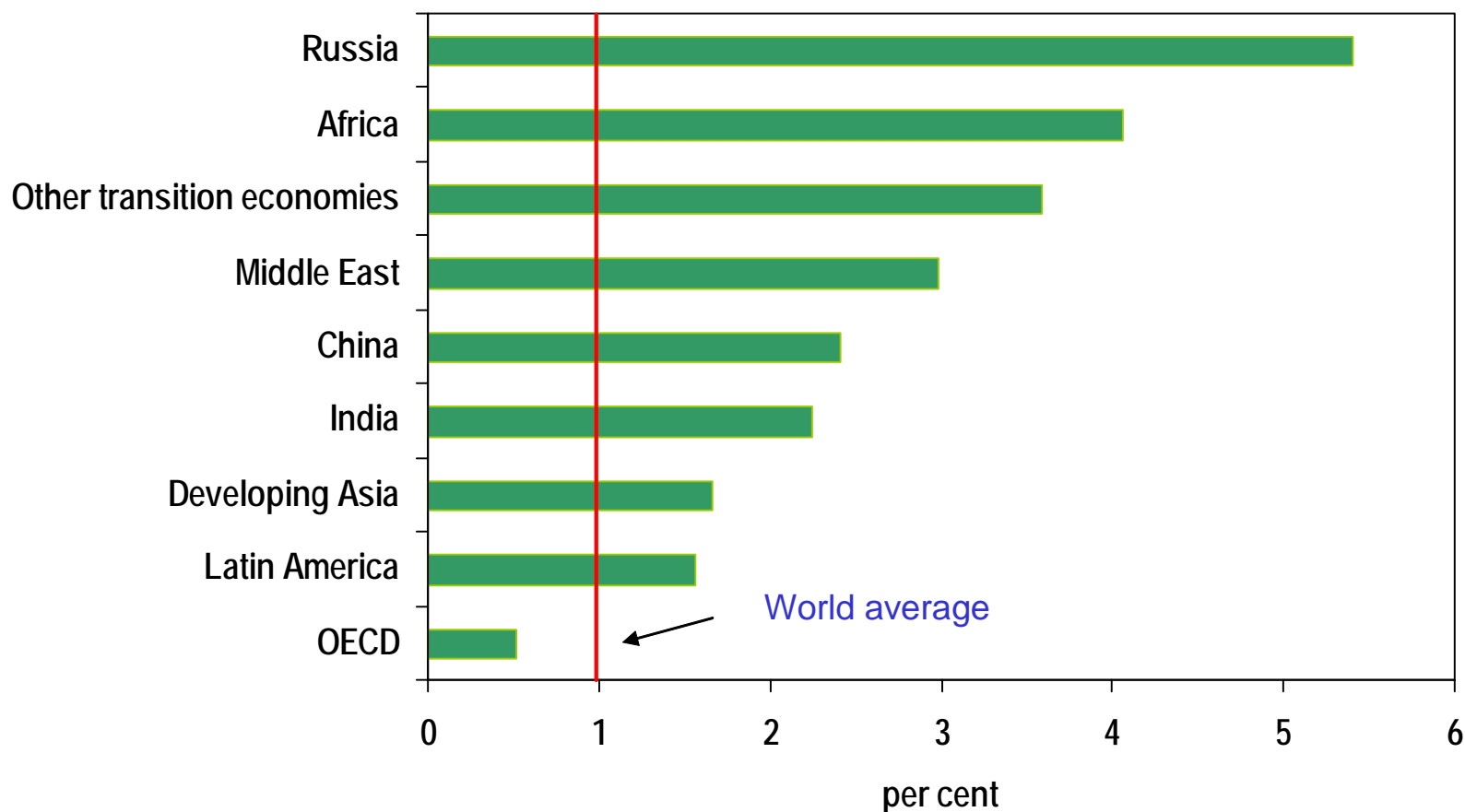
Energy Investment by Region 2001-2030

Total Investment: \$16 Trillion



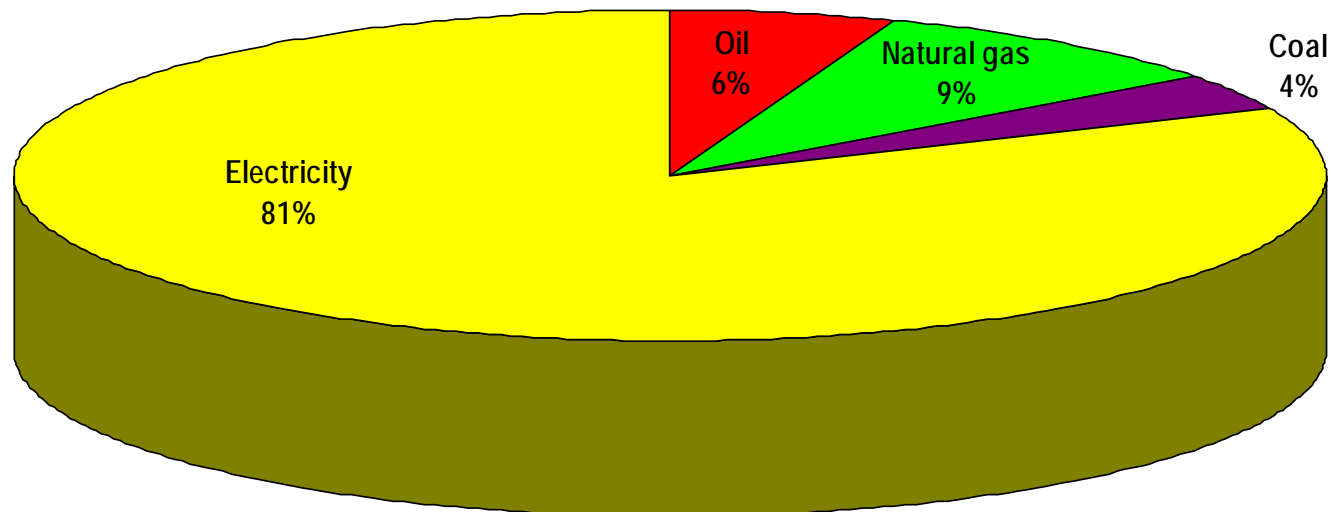
**Almost half global energy investment will be needed in
developing countries**

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

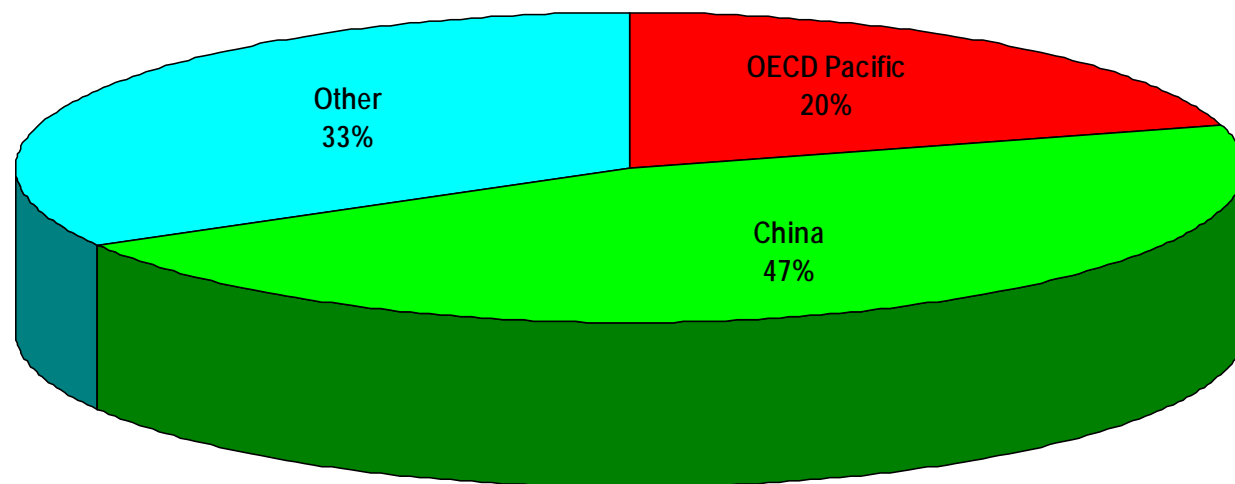
Asia-Pacific Energy Investment by Fuel 2001-2030



Cumulative investment = \$5.3 trillion

Electricity dominates energy investment – even more so if investments in fossil fuels chains to supply power plants are included

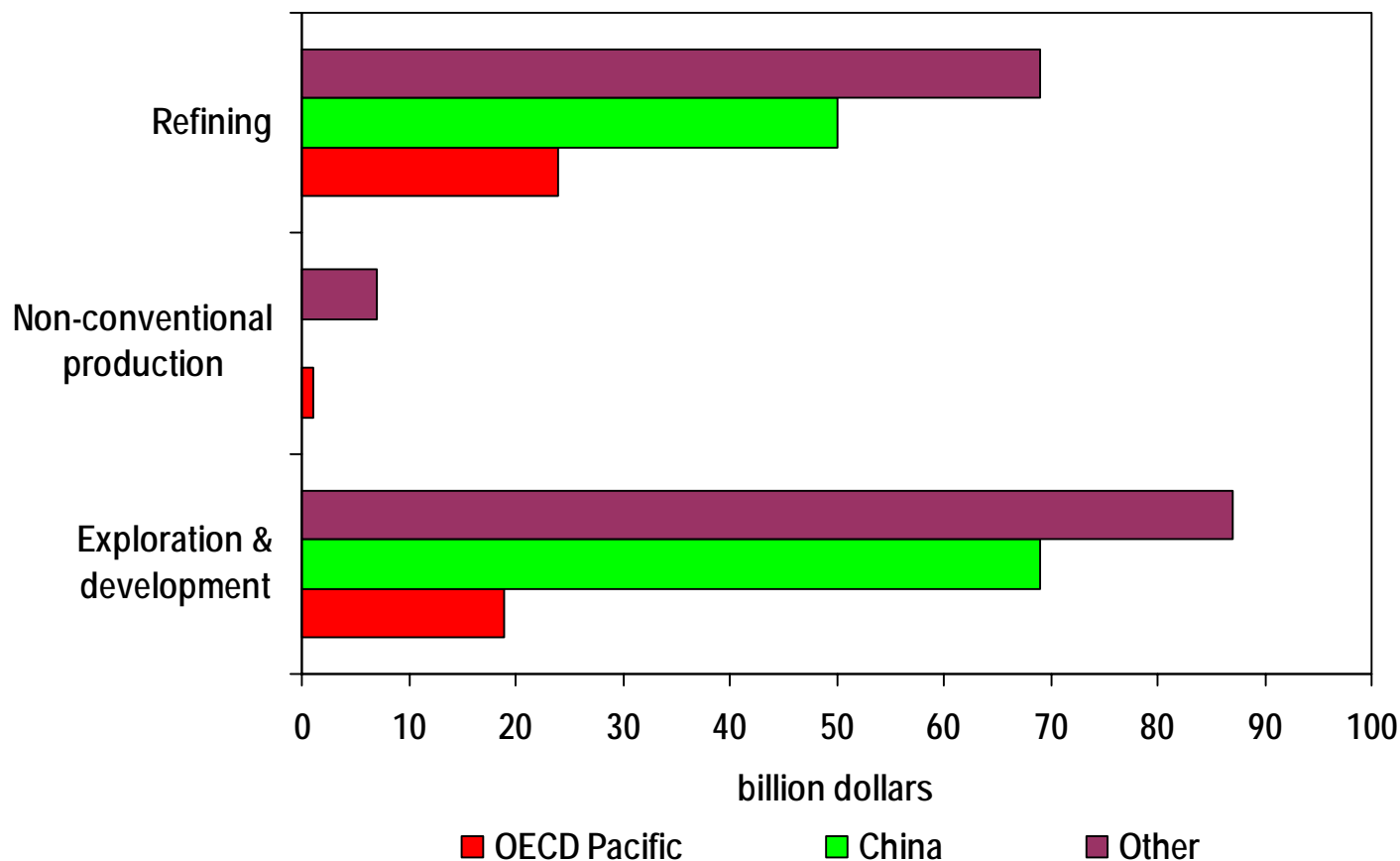
Asia-Pacific Energy Investment by Country/Region 2001-2030



Cumulative investment = \$5.3 trillion

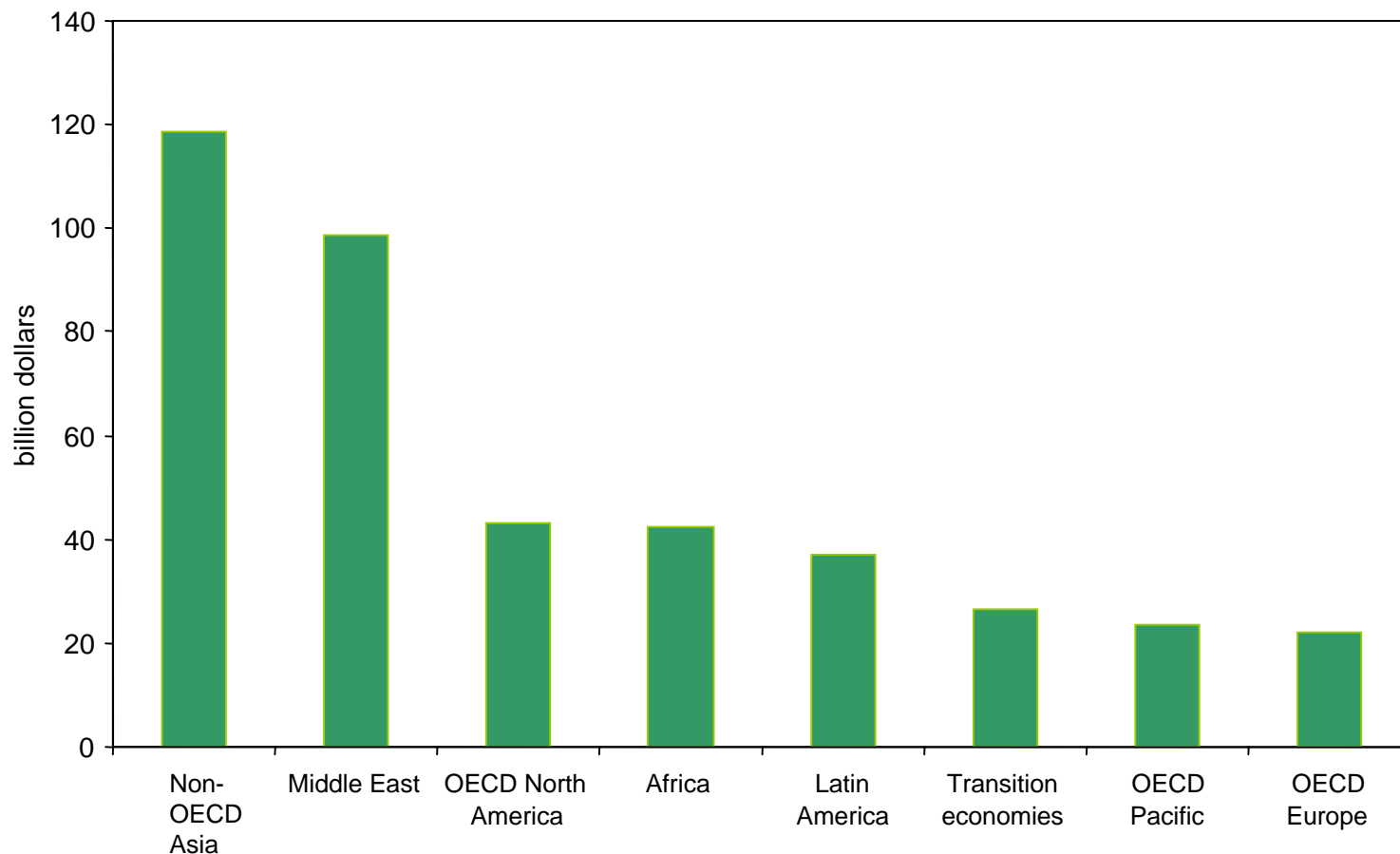
**China will account for a growing share of energy investment
during the projection period**

Oil Investment in Asia-Pacific 2001-2030



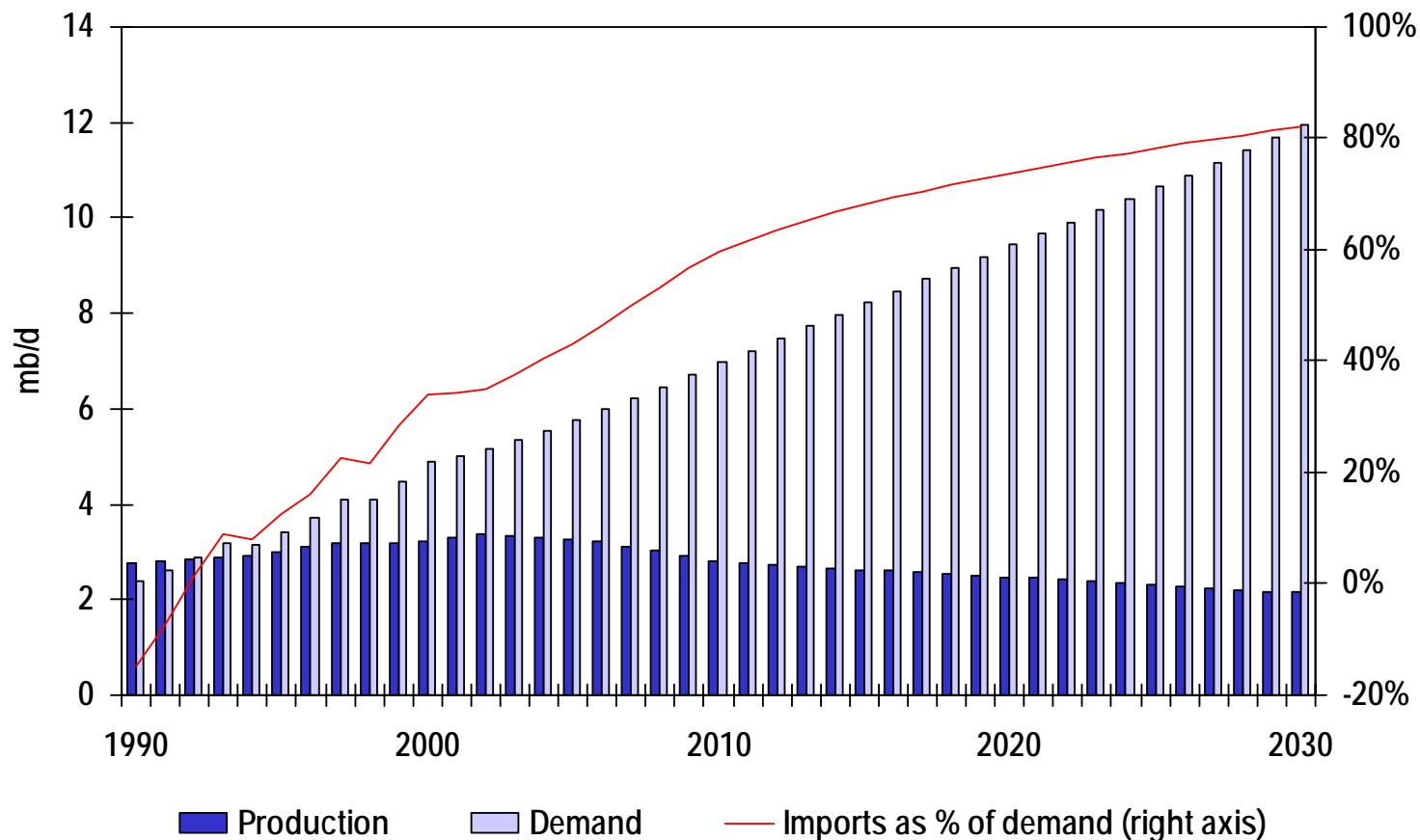
The upstream will absorb the largest share of total oil investment, but it will eventually decline as the limited oil reserves are exhausted

Refinery Sector Cumulative Investment by Region 2001-2030



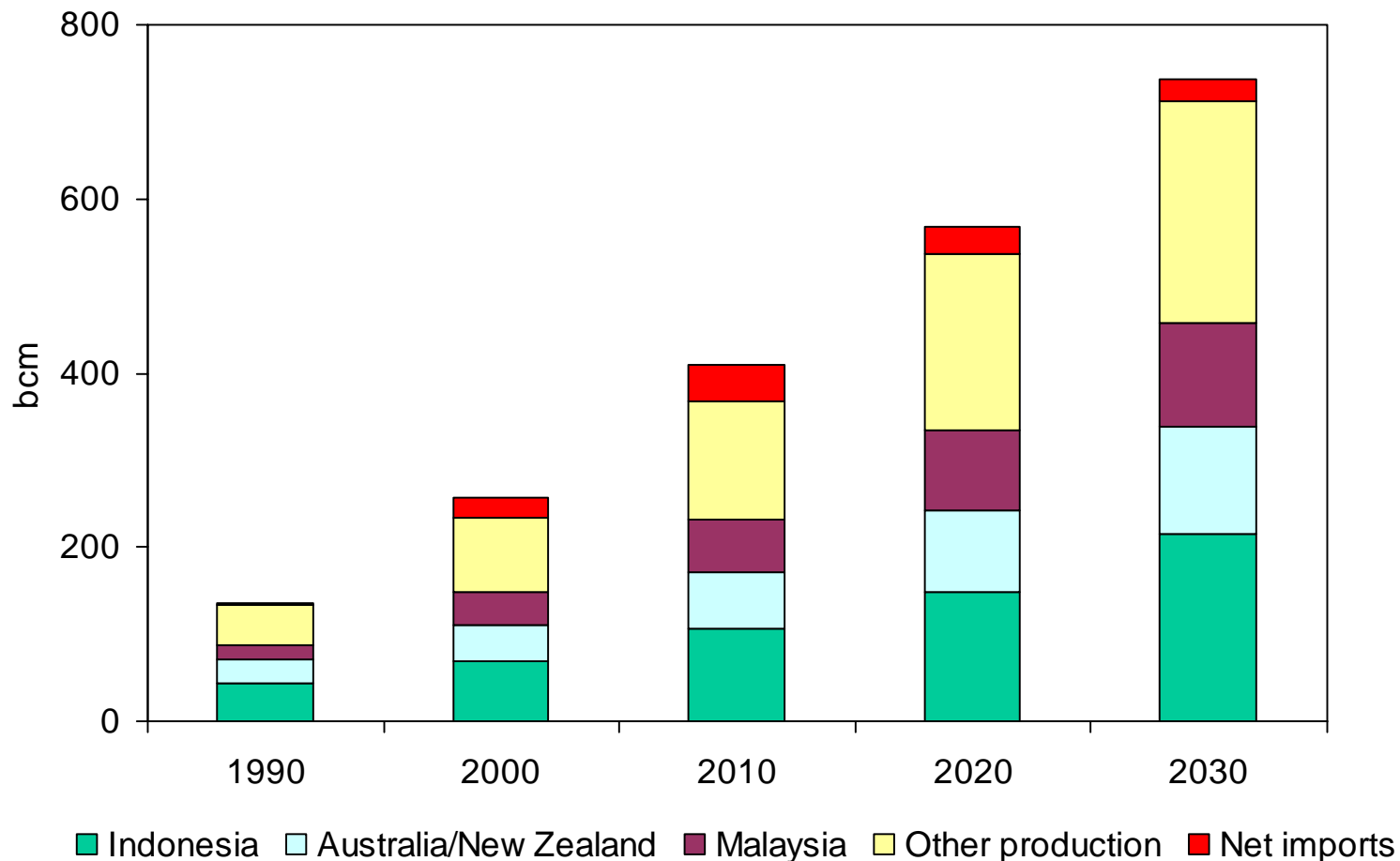
Most refining investment will take place in developing Asia and the Middle East, mainly for new refinery construction

China Oil Supply Outlook



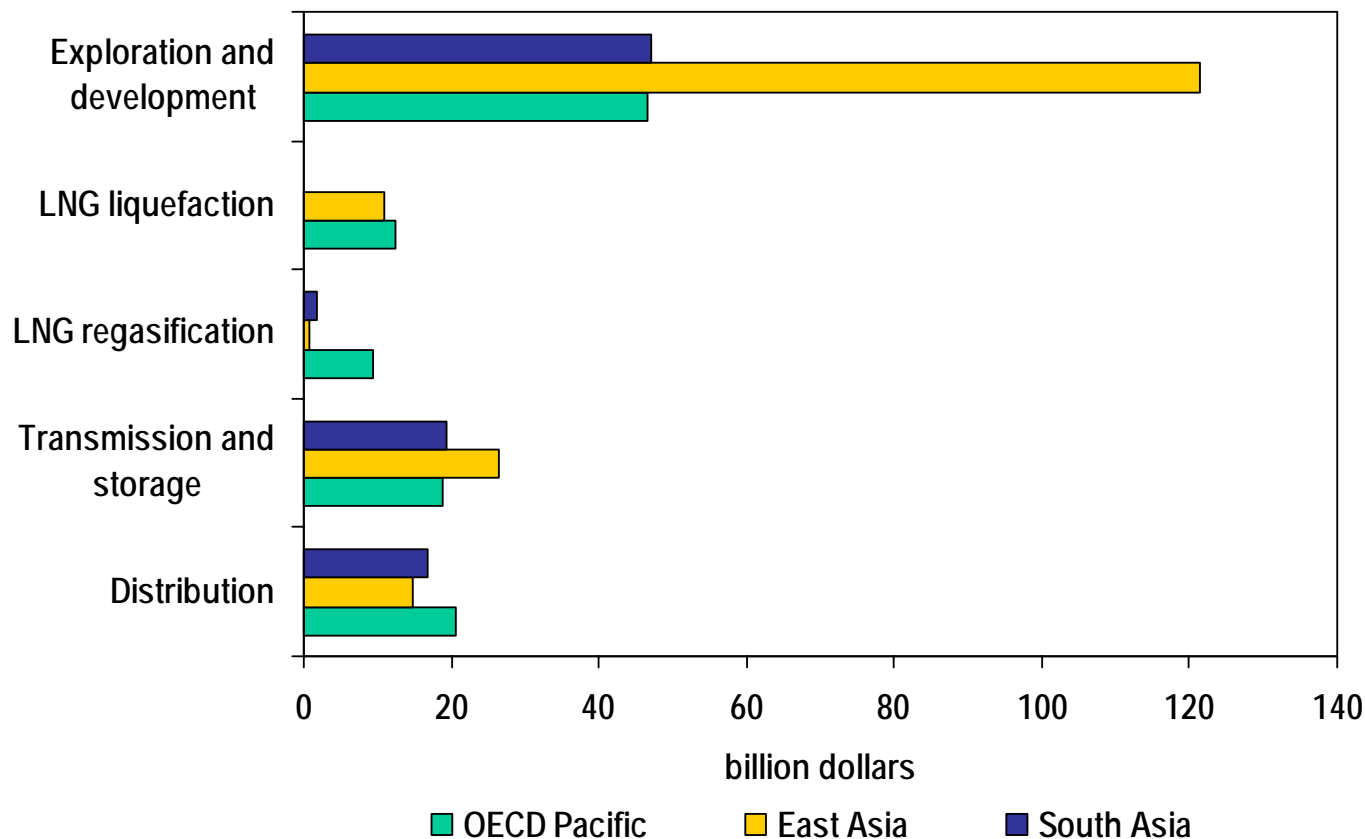
China's oil imports will soar from less than 2 mb/d now to almost 10 mb/d in 2030 – equal to over 80% of domestic demand

Gas Production and Imports in Asia-Pacific



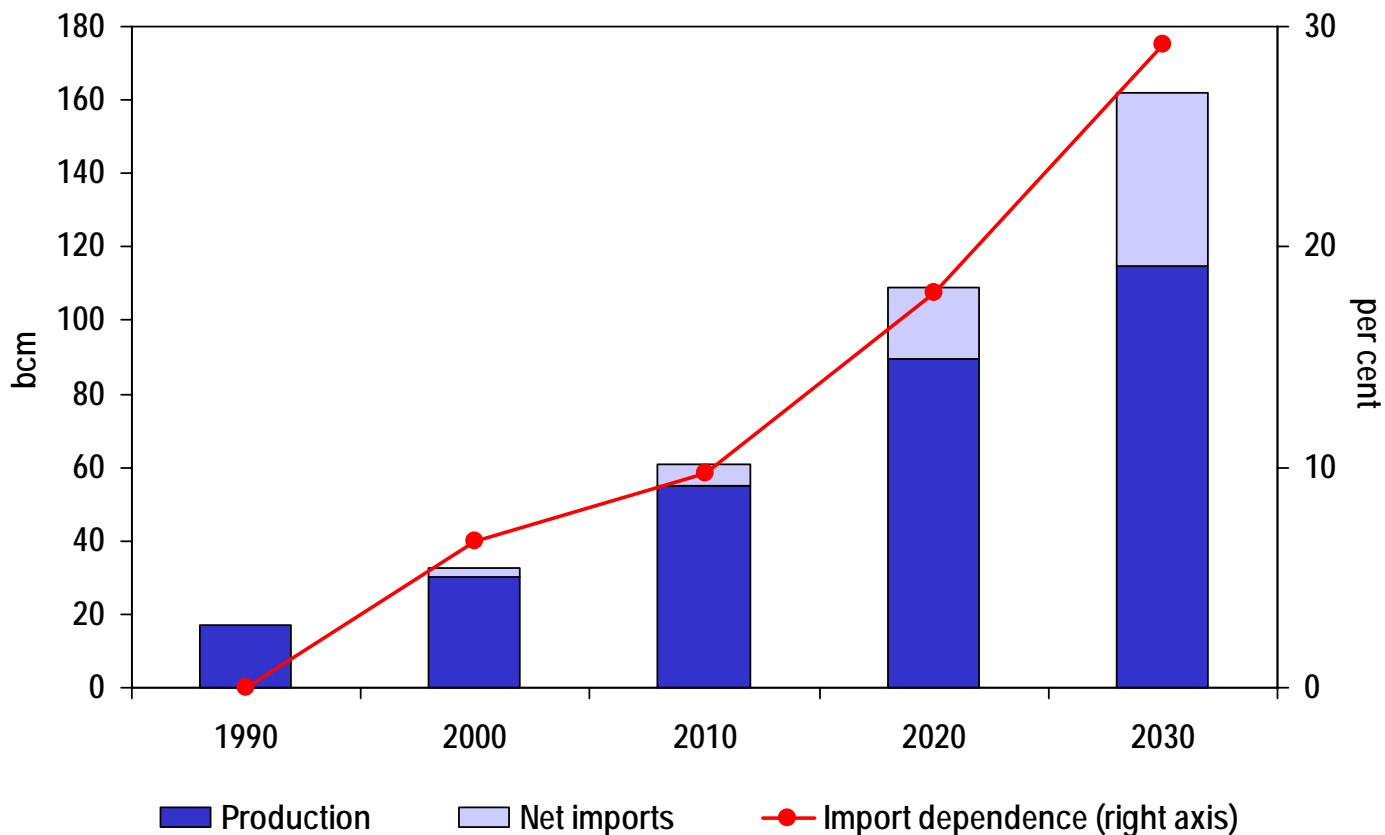
Gas production in Asia-Pacific region will grow more strongly than demand, so that net imports from outside the region will decline eventually

Gas Investment in Asia-Pacific 2001-2030



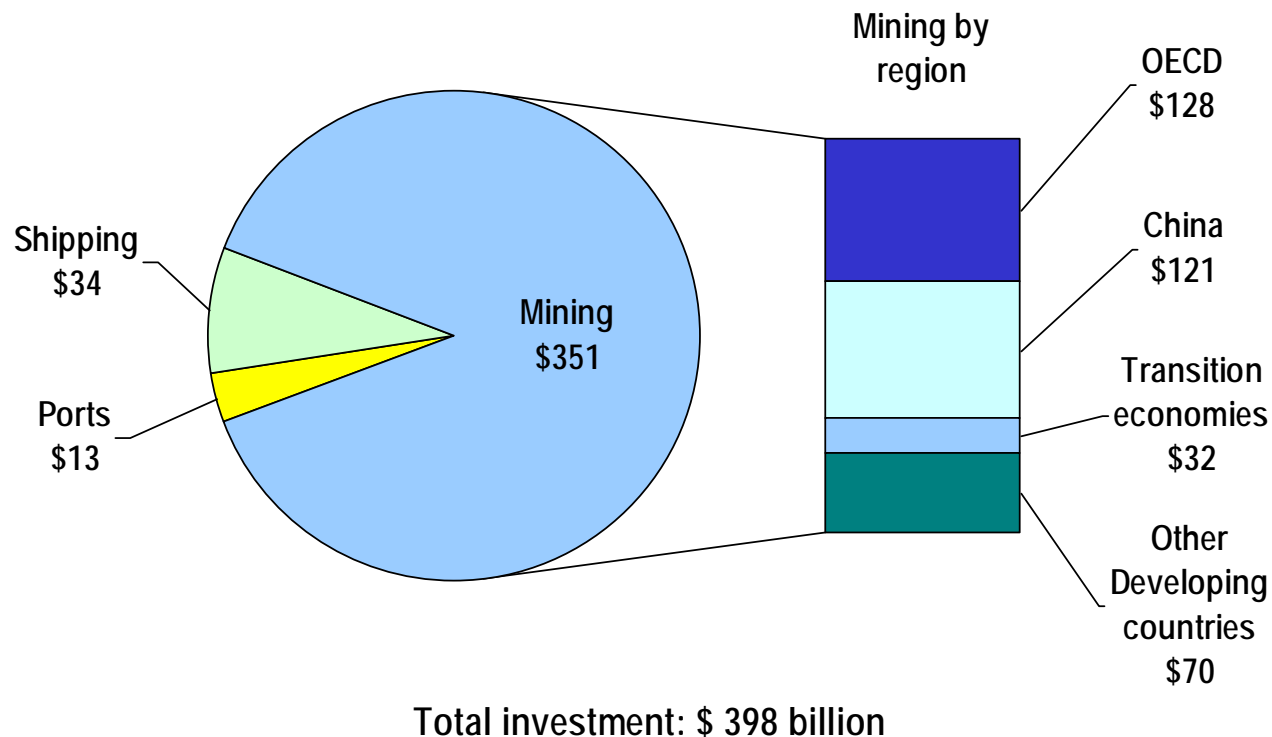
Asia-Pacific region needs to invest around \$470 billion in gas sector, especially in Australia, Indonesia and Malaysia. Upstream investment will account for most of this amount

Gas Supply in China



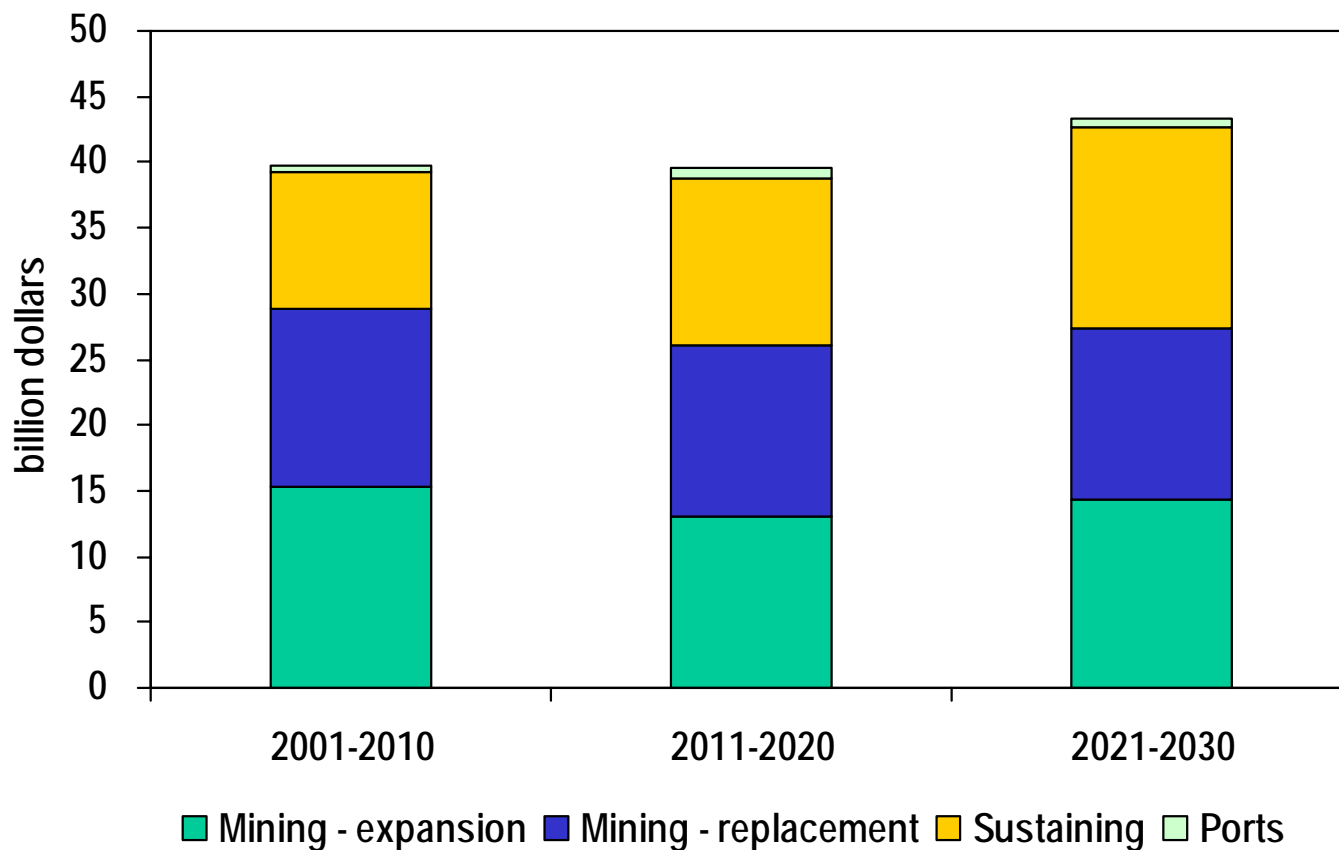
Although China's gas production will rise rapidly, demand will be increasingly met by imports

Coal Industry Investment 2001-2030



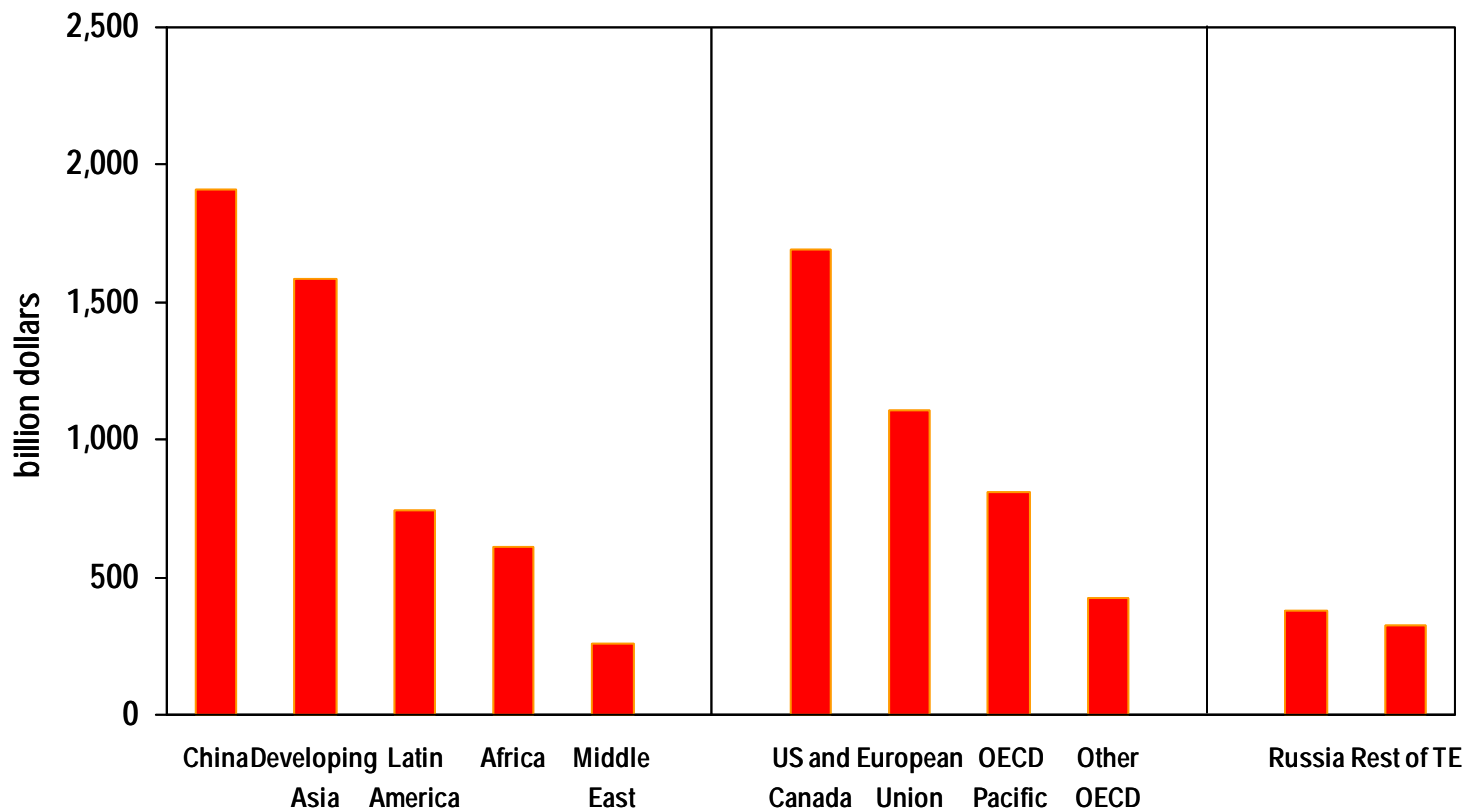
**Almost all coal investment will be for mining – a third of it
in China alone**

China Coal Investment



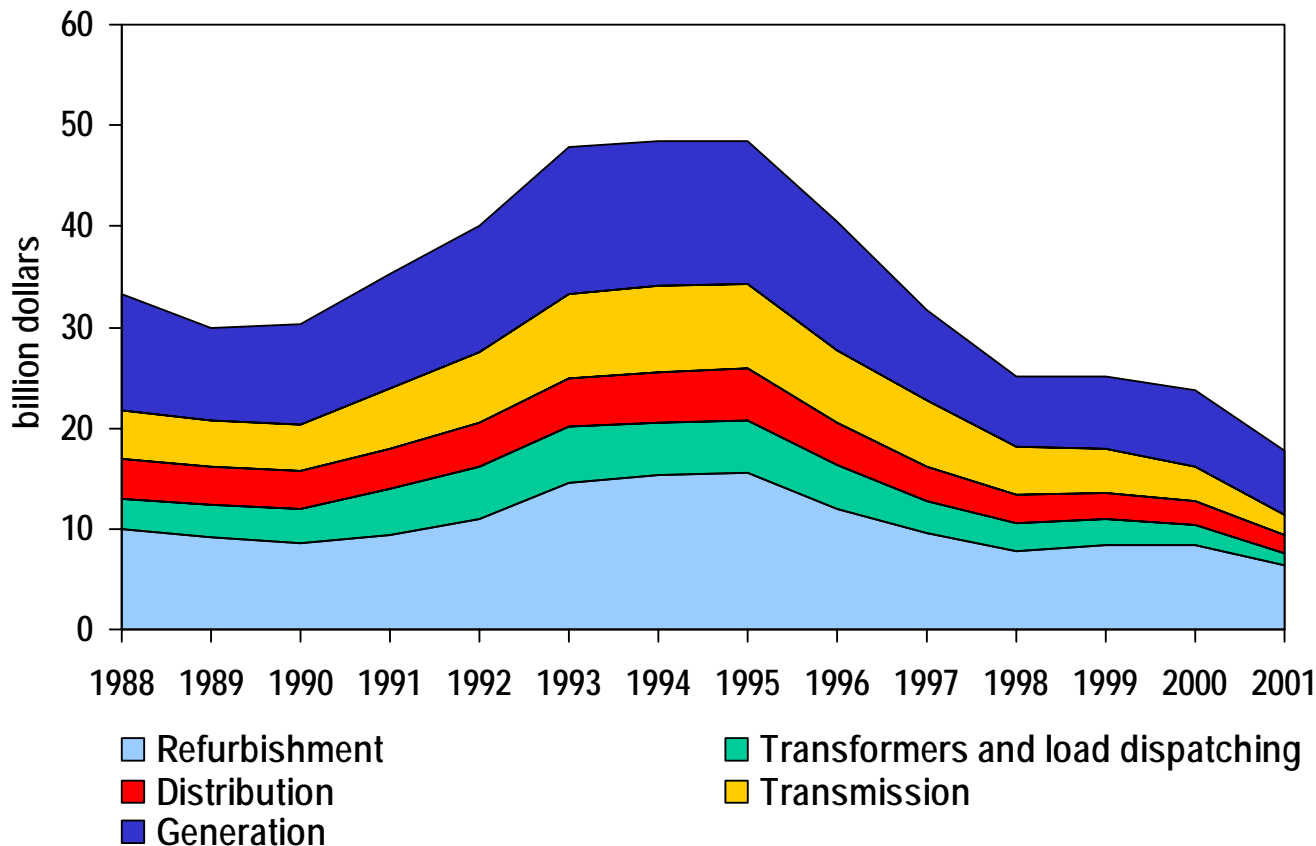
China will need to invest more than \$4 billion per year to raise productivity, improve safety & meet demand growth

Electricity Sector Investment by Region 2001-2030



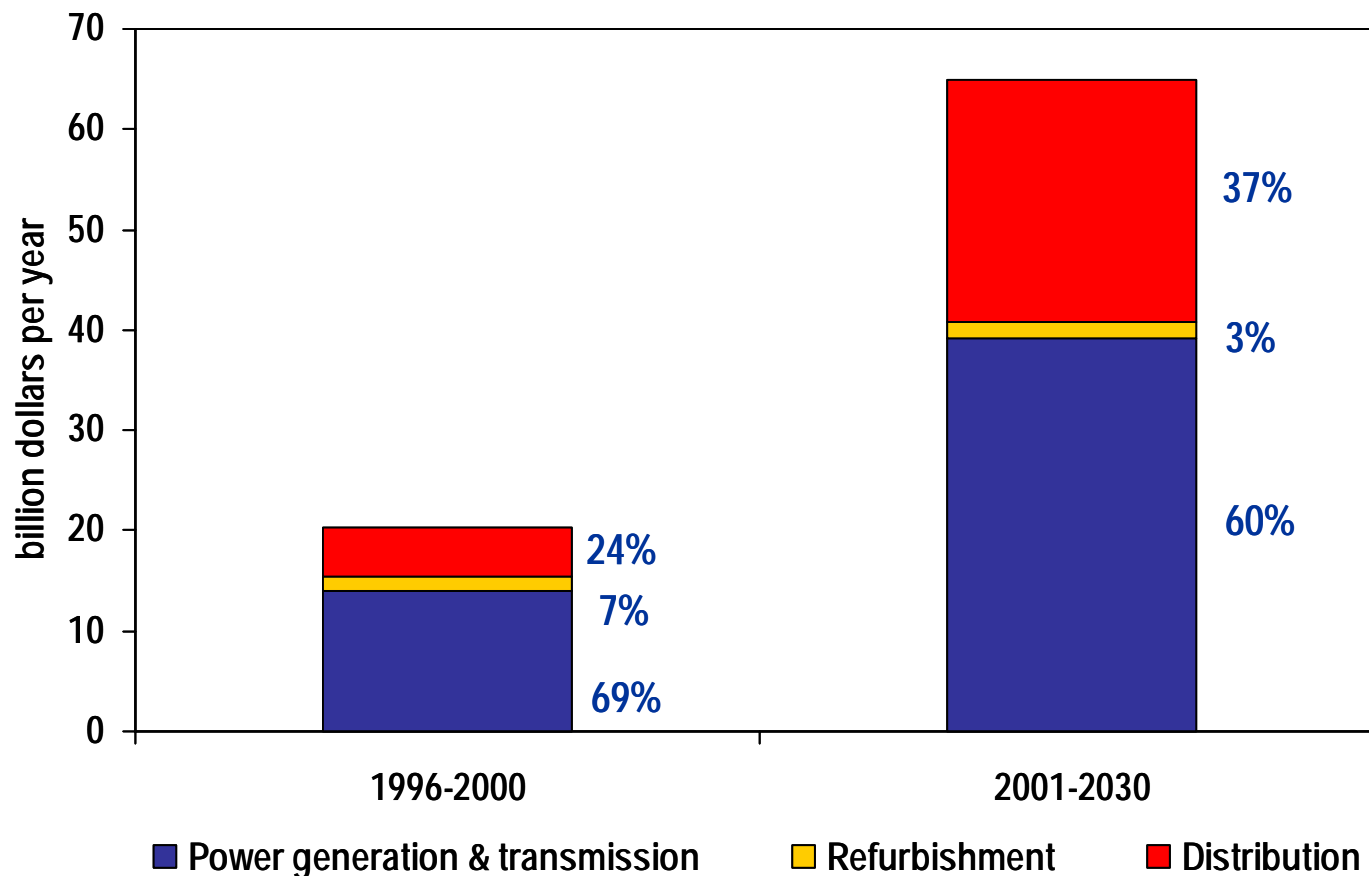
Electricity investment needs is particularly high in developing Asia, as developing Asia has the strongest demand in the world

Electricity Sector Investment in Japan



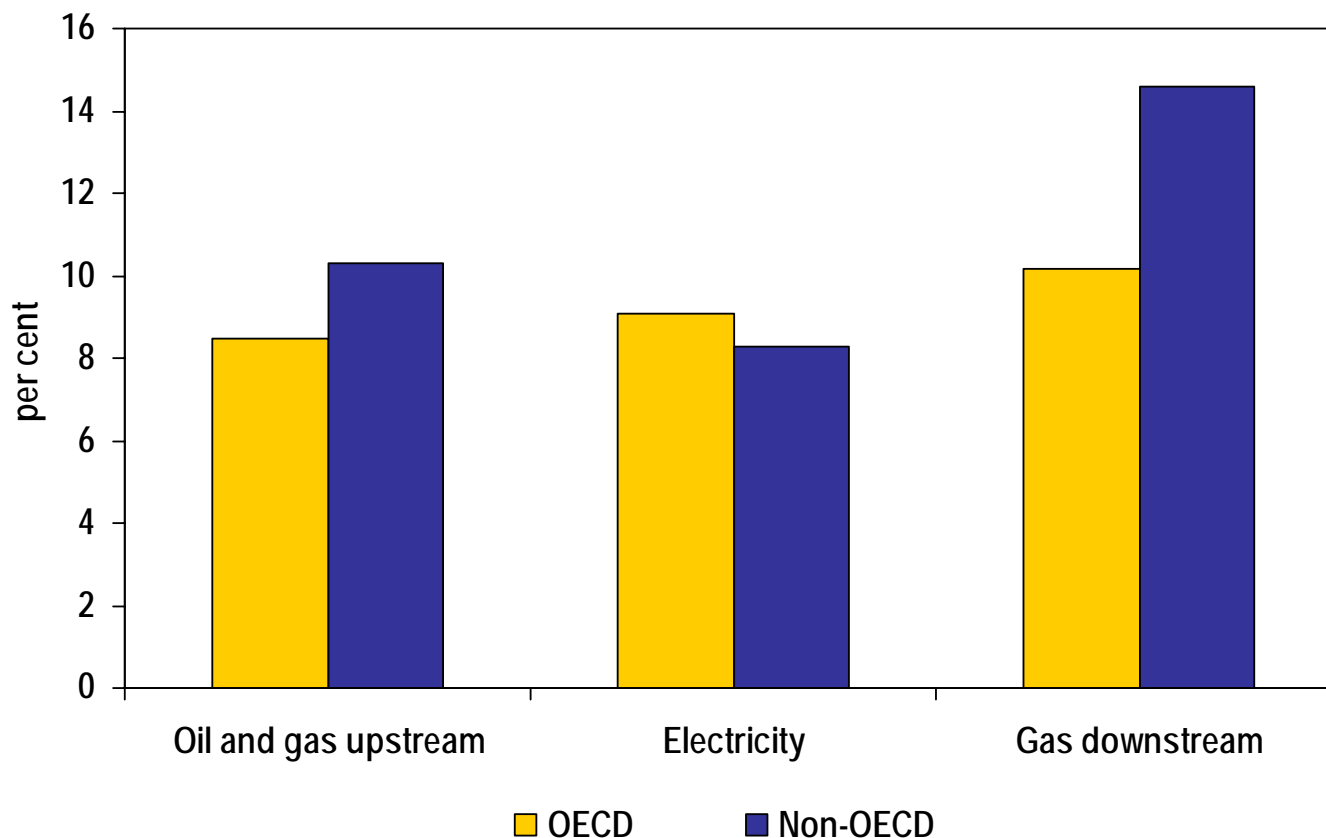
Investment in Japan has plunged – largely as a result of slowing demand growth

China Electricity Investment



China's electricity investment needs will increase sharply in the coming decades – especially for transmission & distribution

Return on Energy Investment 1993-2002



Higher risk in non-OECD countries generally should suppose higher return – but this has not been the case for electricity

Financing Energy Investment in Asia-Pacific

- **Oil and gas:** producer countries' policies and decline rates are key long-term uncertainties for upstream investment needs
- **Coal:** investment will depend on relative prices and environmental policies
- **Electricity and downstream gas:**
 - OECD countries – uncertainties about impact of market reforms on investment
 - Non-OECD countries – investment doubts due to inadequate local financial markets, limited access to international capital and poor energy-sector governance

Financing Electricity Investment in Developing Asia

- **\$4.3 trillion needed in developing Asian countries (2001-2030) – far more than in past 3 decades**
- **Financing this will be challenging**
- **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**

Asia-Pacific: Concluding Observations

- **More than \$5 trillion of energy investment needed in Asia-Pacific – mostly for electricity in developing countries**
- **Implications of market reforms and environmental policies are main uncertainties for OECD Pacific countries**
- **Financing electricity-sector investment is biggest challenge for developing Asian countries**

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**

Broader Policy Implications: “Wake-Up Call” for Governments

- **Increasing emphasis on creating right enabling conditions – and lowering barriers to investment**
- **Less direct intervention as lender or owner**
- **Governments should monitor and assess the need to adjust regulatory reforms in network industries**
- **Policymakers need to ensure basic principles of good governance are applied and respected – including cost-reflective pricing**
- **Fiscal and regulatory incentives to develop advanced technologies – carbon sequestration, hydrogen, fuel cells, advanced nuclear reactors, etc. – could speed their deployment and dramatically alter energy investment patterns and requirements to 2030**