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World Energy Outlook 2004

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RIETI

Tokyo, 16 December 2004

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Global Energy Trends: Reference Scenario

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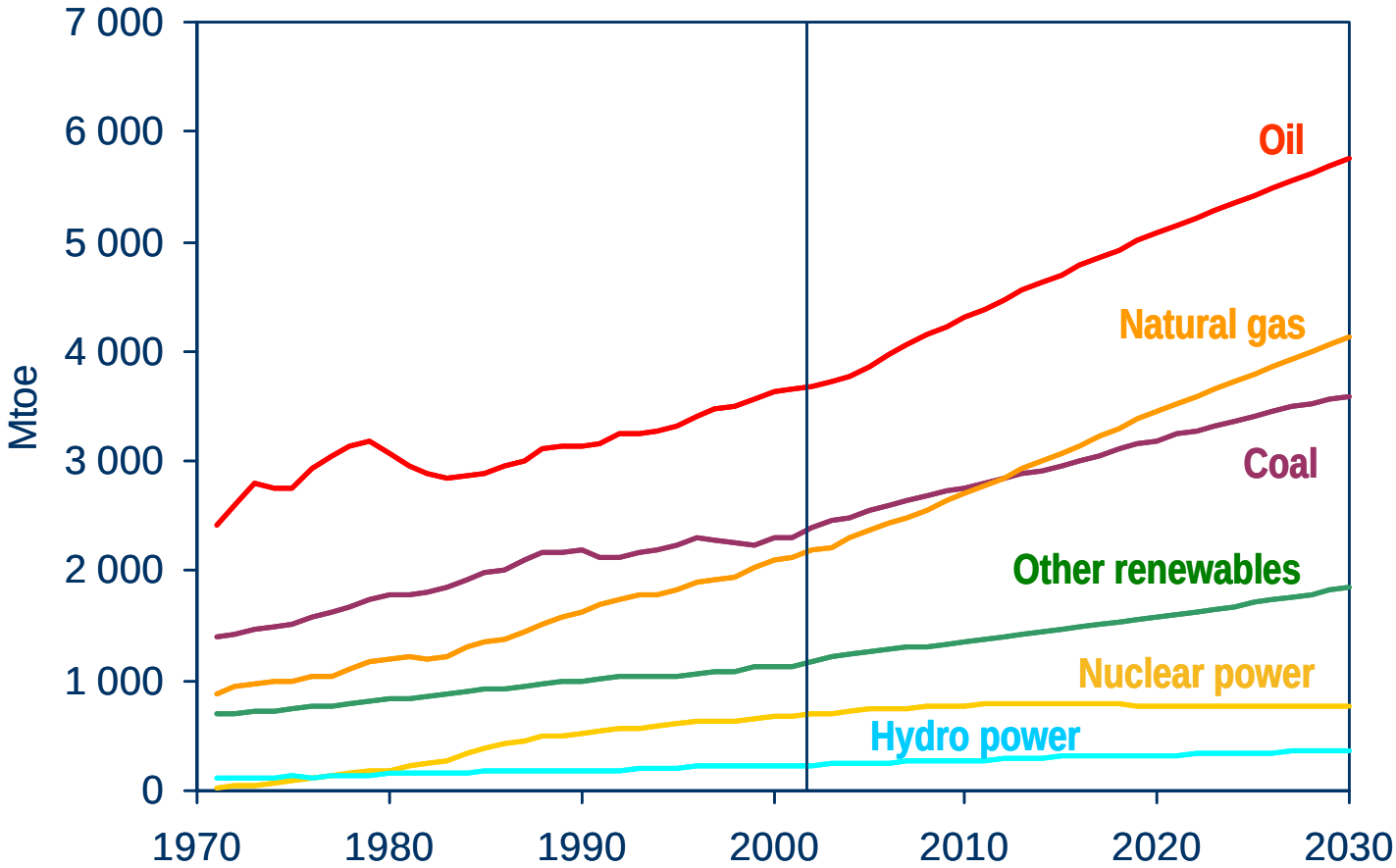
World Primary Energy Demand



Fossil fuels will continue to dominate the global energy mix, while oil remains the leading fuel

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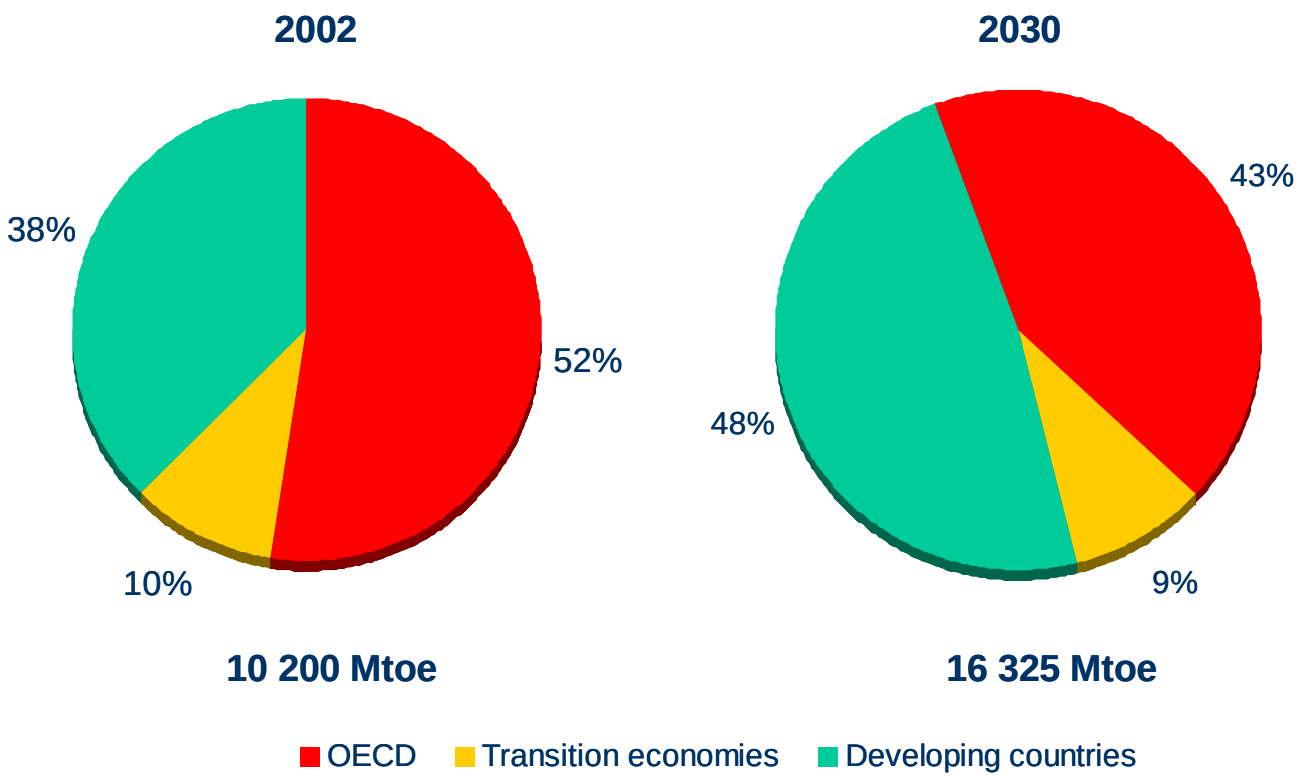
Regional Shares in World Primary Energy Demand



Two-thirds of the increase in world demand between 2002 and 2030 comes from developing countries, especially in Asia

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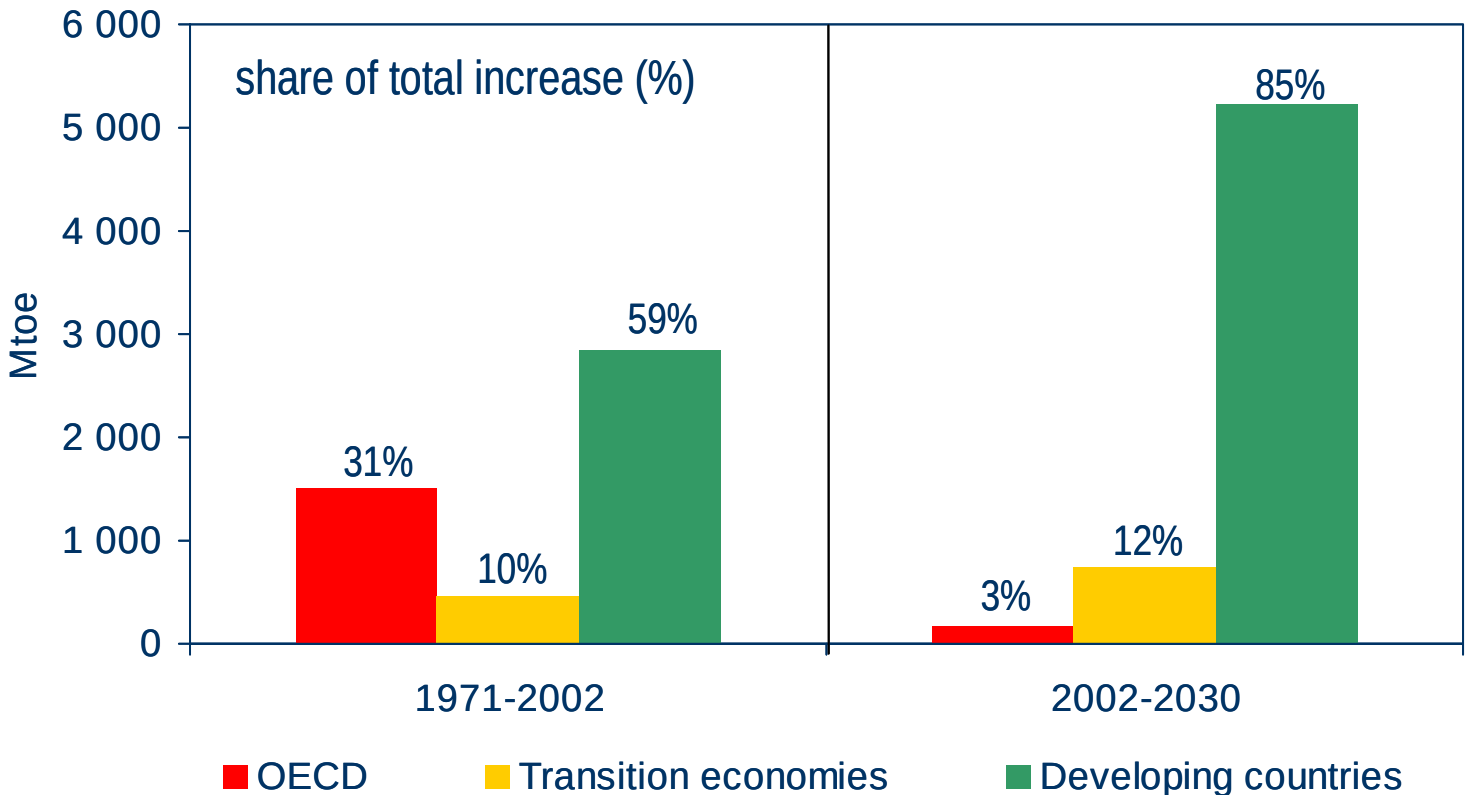
Increase in World Primary Energy Production by Region



Almost all the increase in production to 2030 occurs outside the OECD, up from less than 70% in 1971-2002

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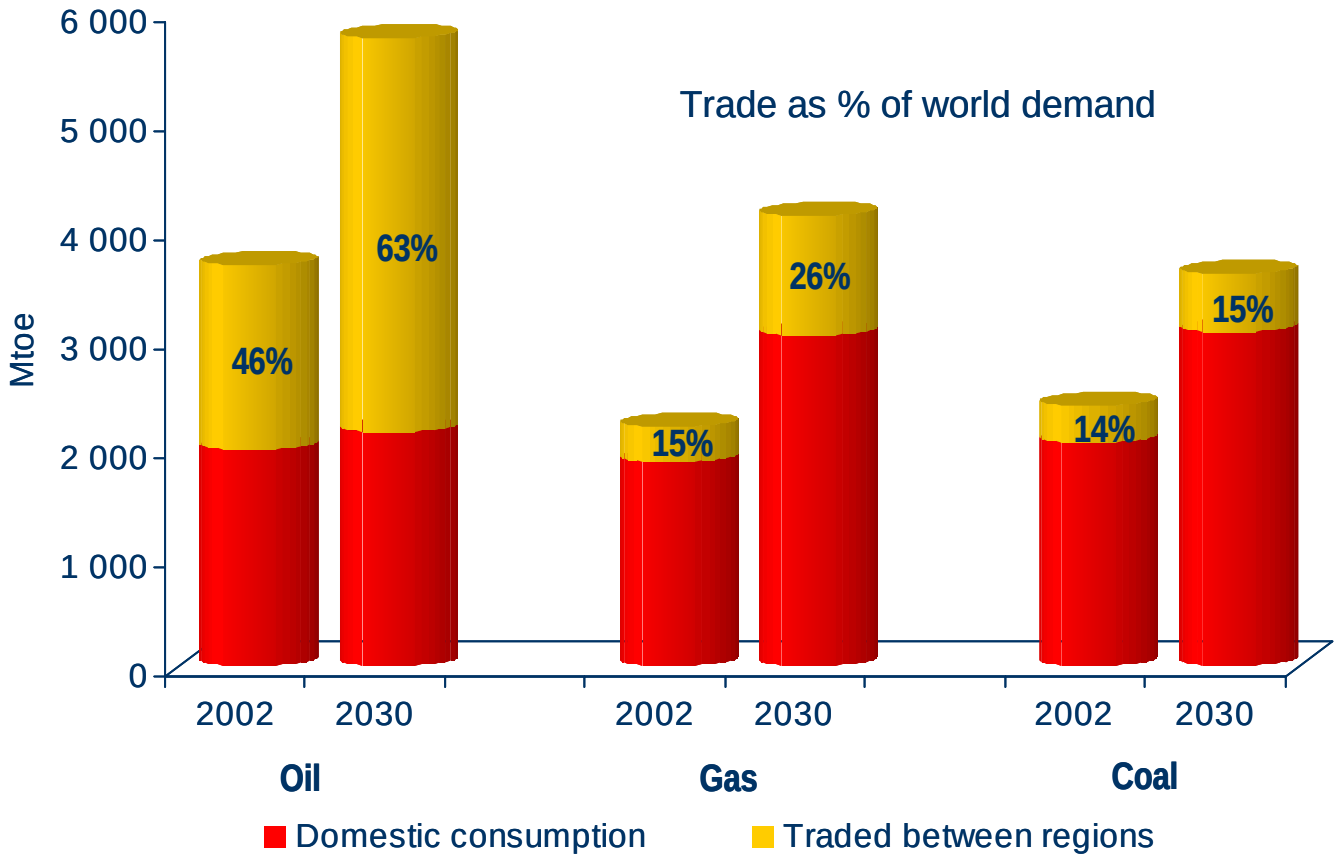
Inter-Regional Trade in World Fossil-Fuel Supply



Energy trade between regions more than doubles by 2030, most of it still in the form of oil

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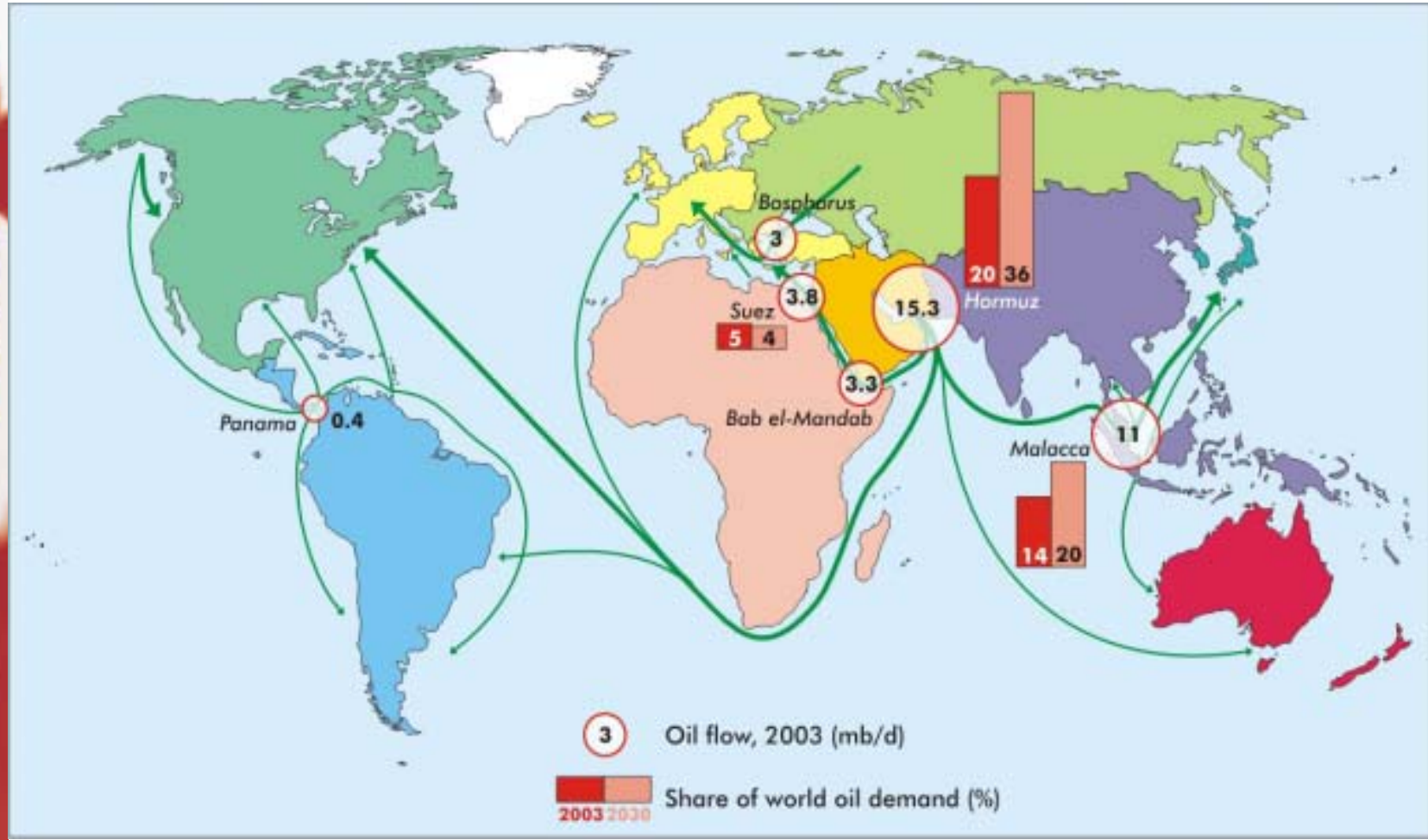
Oil Flows & Major Chokepoints: The "Dire Straits"



The risk of an oil-supply disruption will grow as trade & flows through key maritime & pipeline chokepoints expand

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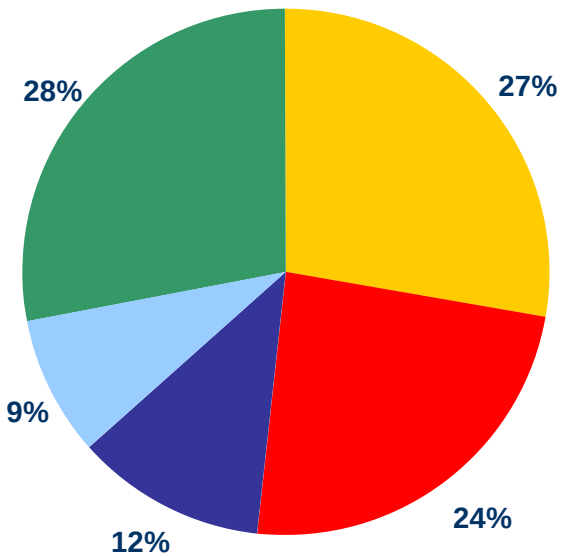
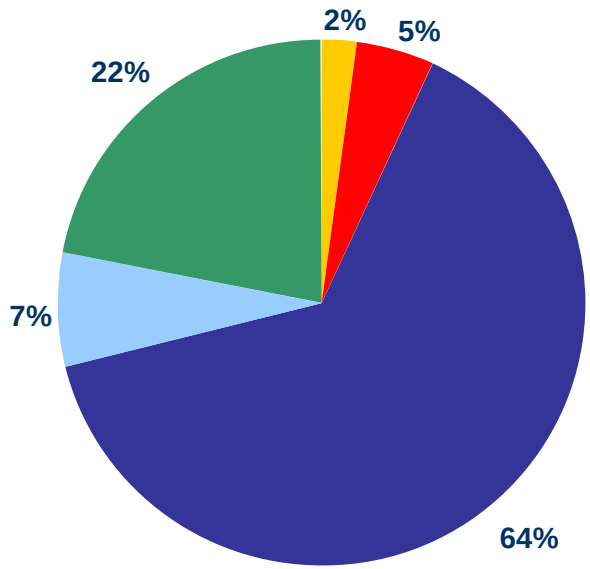
Undiscovered Oil and Gas Resources and Exploration Wells Drilled, 1995-2003

Undiscovered Oil & Gas Resources



1.9 trillion boe

Number of New Wells Drilled in 1995-2003



24 500 fields

Middle East
Former Soviet Union
North America
Europe
Africa, Latin America and Asia

Discoveries have fallen in recent years, mainly because exploration has shifted to less prospective regions

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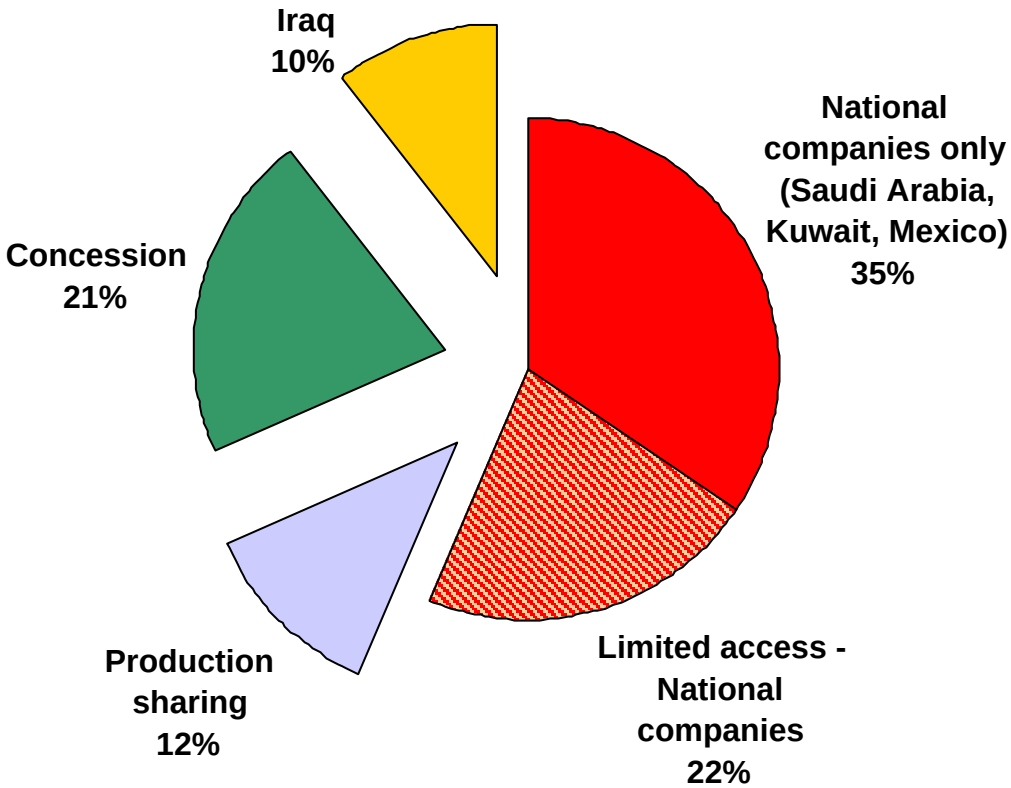
Access to Oil Reserves



1,032 billion barrels

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

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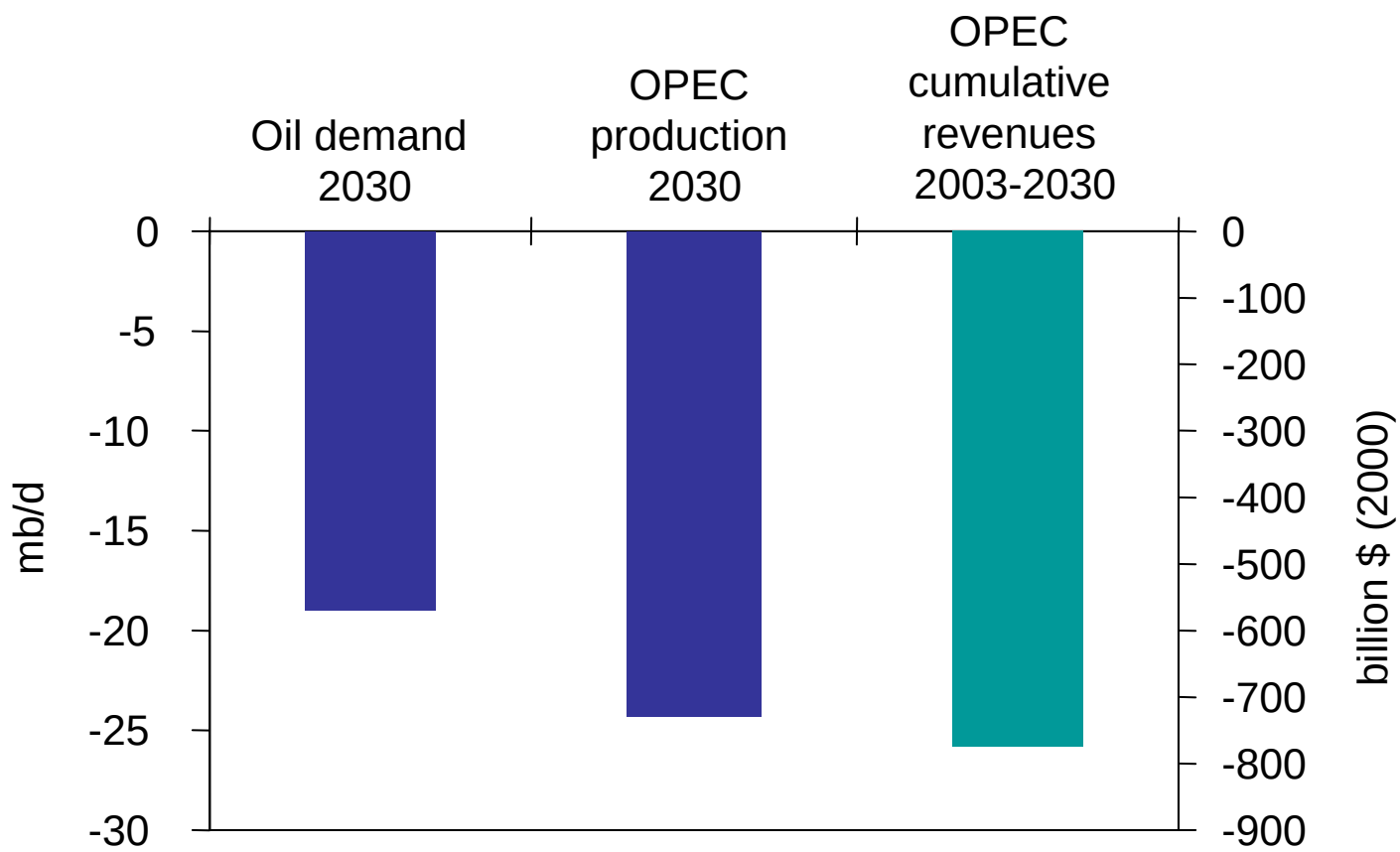
Oil Reserves Transparency

- The Earth's oil resources are adequate until 2030 and beyond
- Less certain is whether sufficient investment will flow to the 'right' locations at the 'right' time
- IEA calls for improved oil reserve data transparency, including:
  - A universally-recognised, transparent, consistent and comprehensive reporting system
  - A system of collecting, compiling & publishing primary data on national reserves
- IEA to develop initiative through international forums in conjunction with others orgs. (eg. OPEC, UN, financial regulators) and our member govts

Oil Market Implications of High Oil Price Case vs Reference Scenario



Crude oil price is assumed to remain at average for 2004 to date, with major implications for global oil markets

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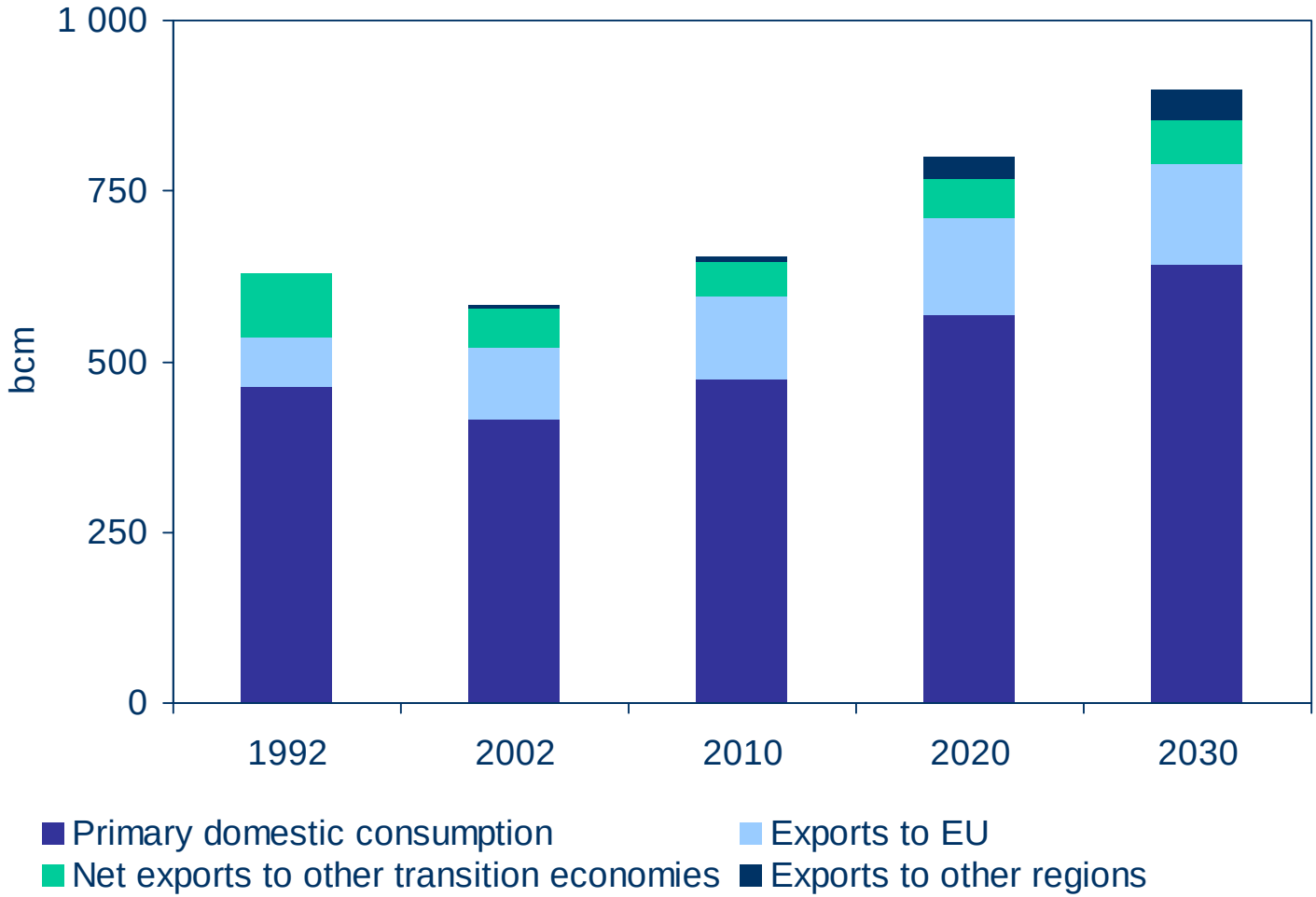
Russian Gas Production



Russia will remain the single largest supplier to the EU, assuming investment in developing new fields is forthcoming

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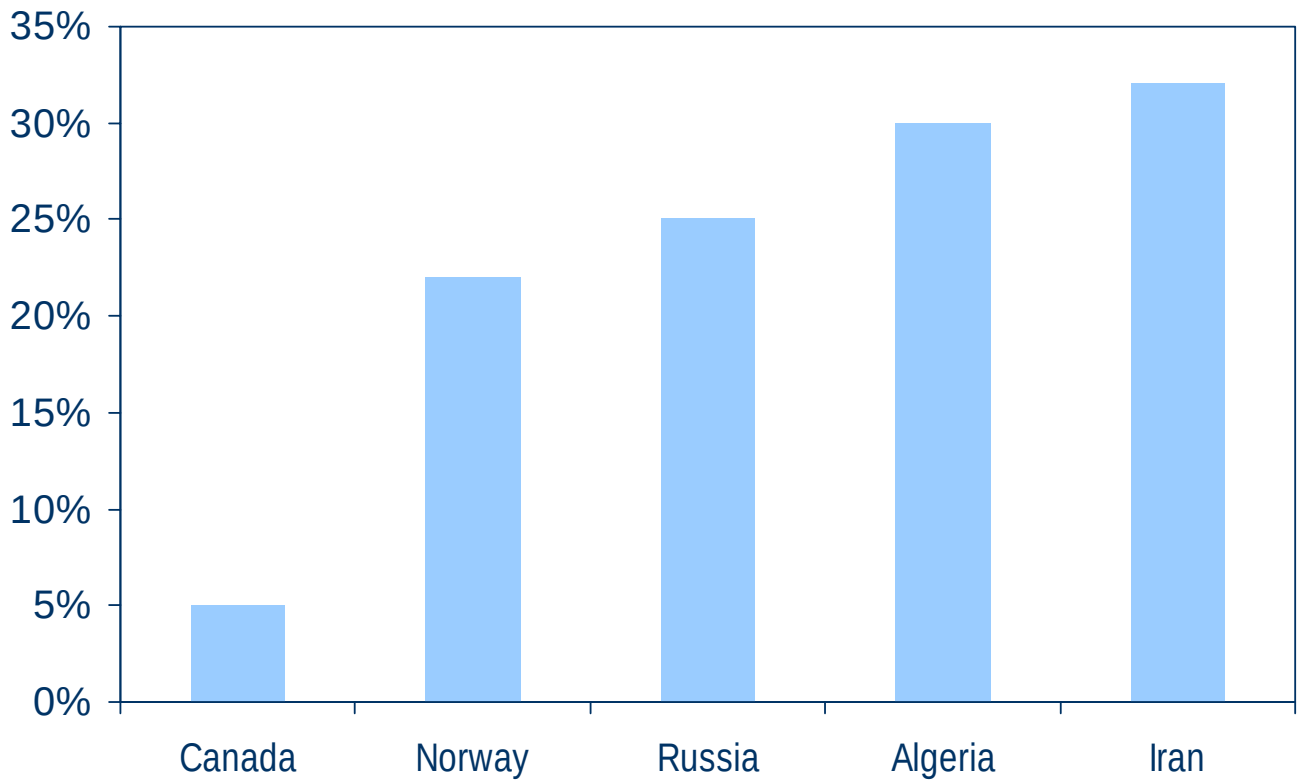
Contribution of Oil & Gas Sectors to GDP, 2002



Importance of oil & gas sector in the Russian economy has grown sharply in recent years, approaching that of some OPEC countries

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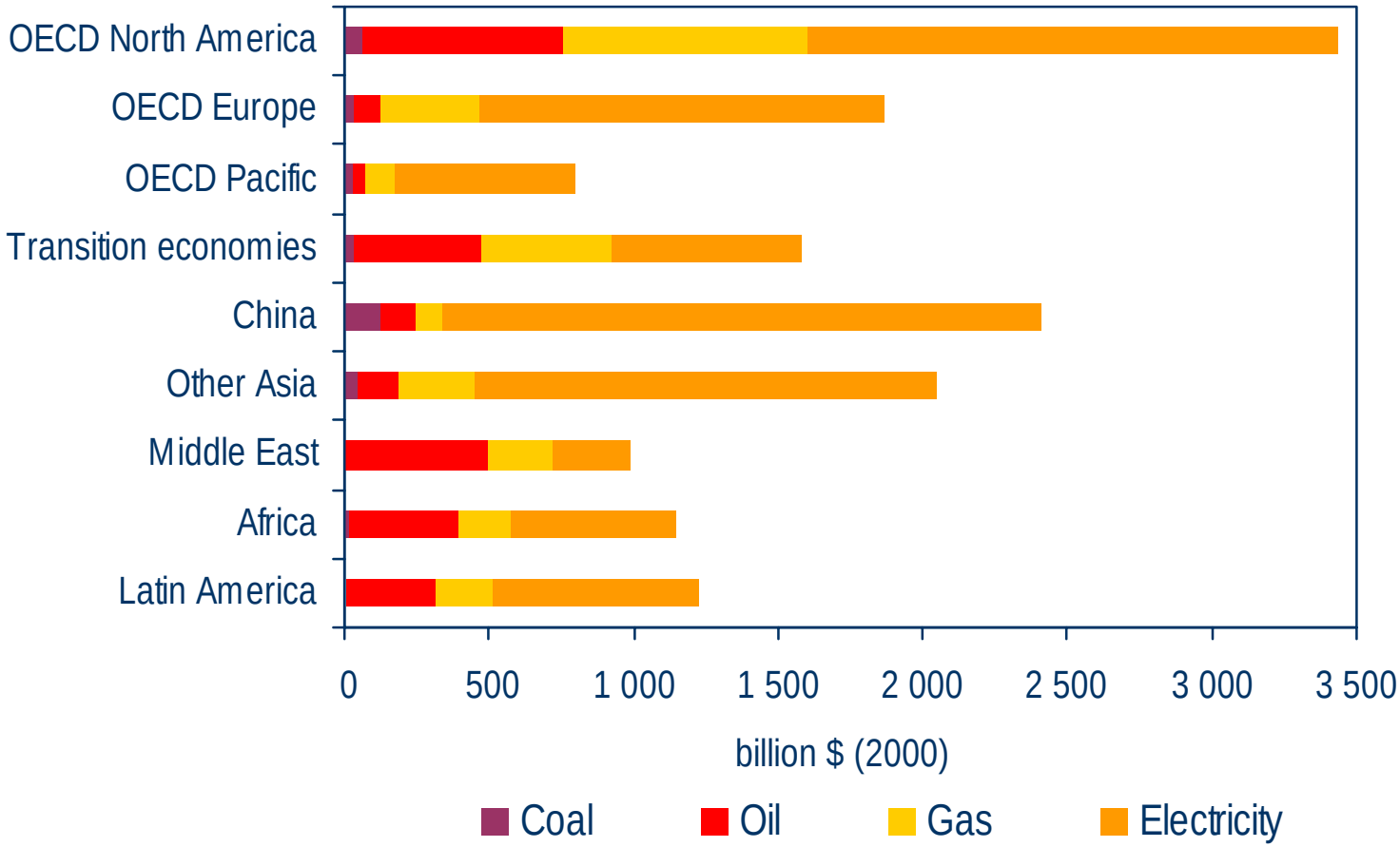
Cumulative Energy Investment, 2003-2030



Power sector absorbs 62% of global energy investment in the period 2003-2030

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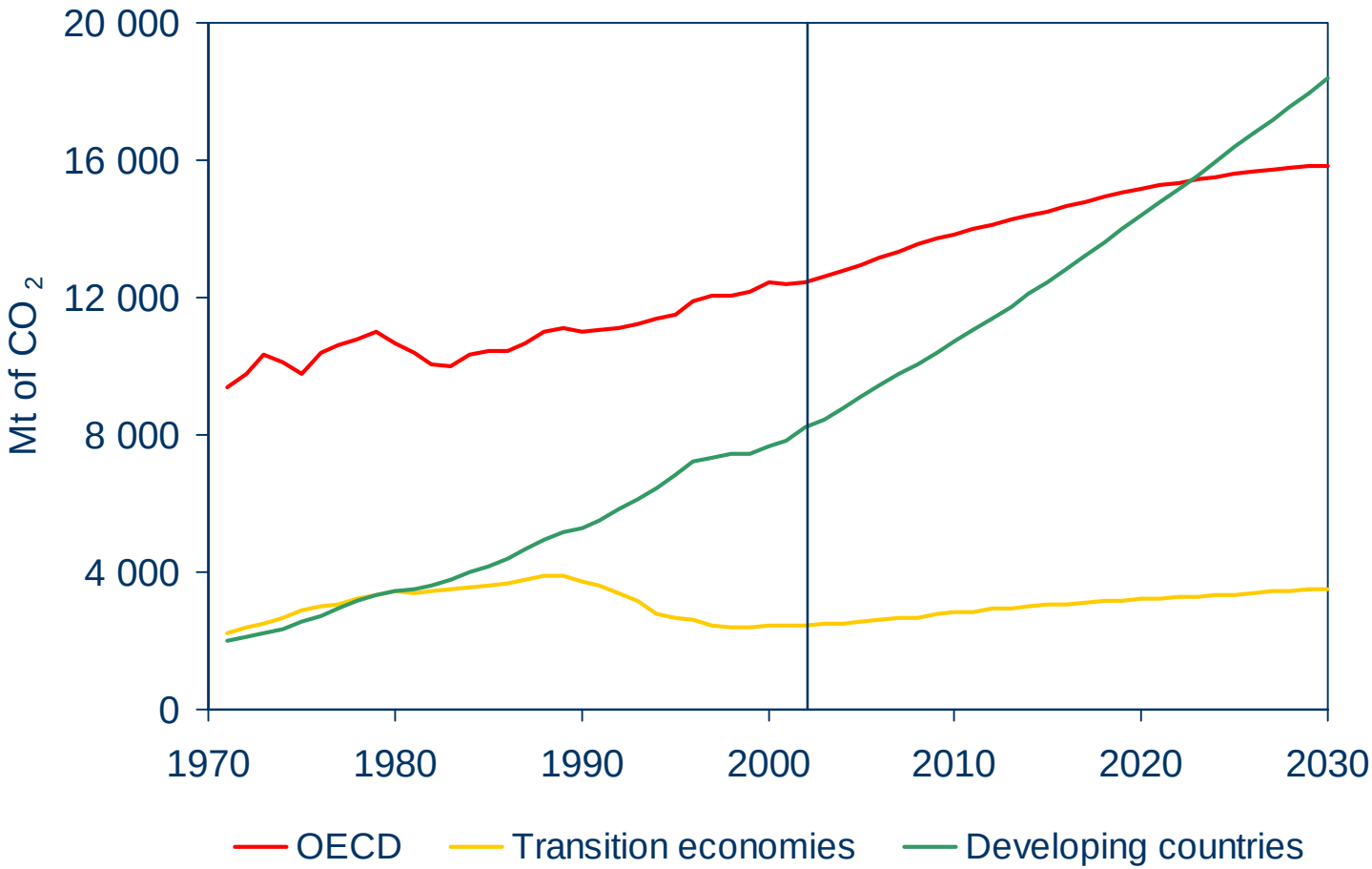
CO_2 Emissions, 1971-2030



CO_2 emissions will increase fastest in developing countries, overtaking OECD in the 2020s

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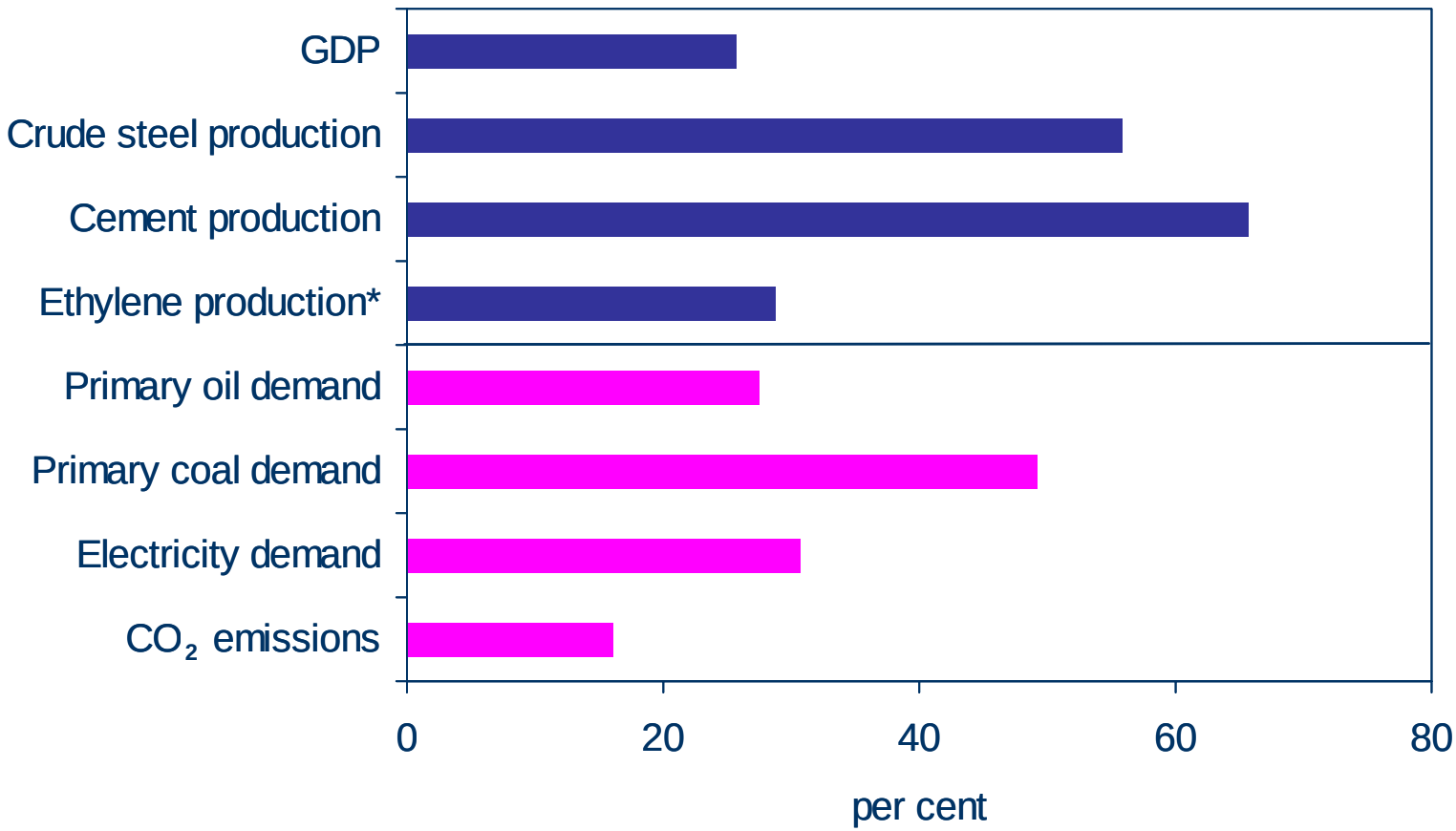
Asia-Pacific Energy Trends: Reference Scenario

China's share of Incremental World Production & Energy Demand, 1998-2003



Booming industrial production in China is driving up energy demand & emissions - and energy prices

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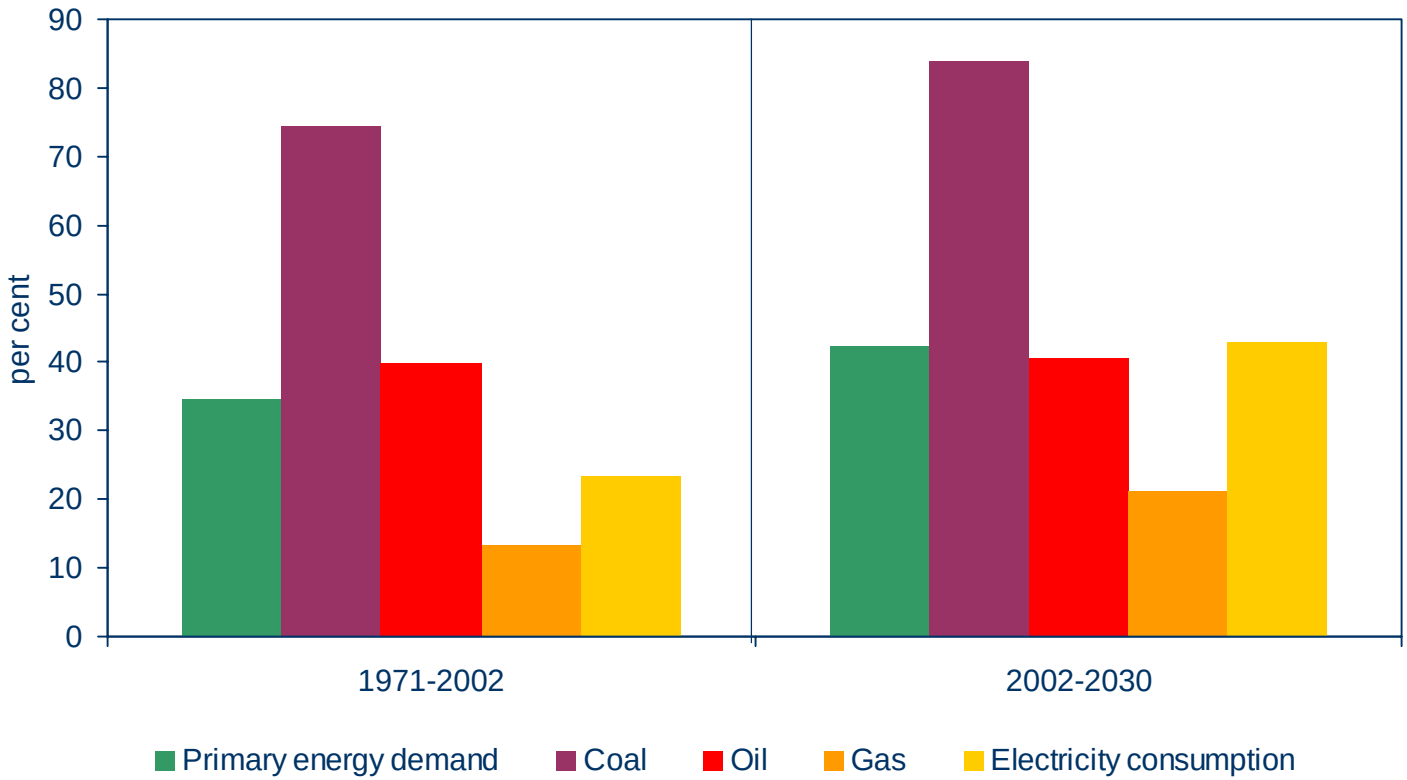
Share of Developing Asia in World Incremental Energy Demand



Developing Asia will account for 42% of the increase in demand through 2030, compared with 34% in the last three decades

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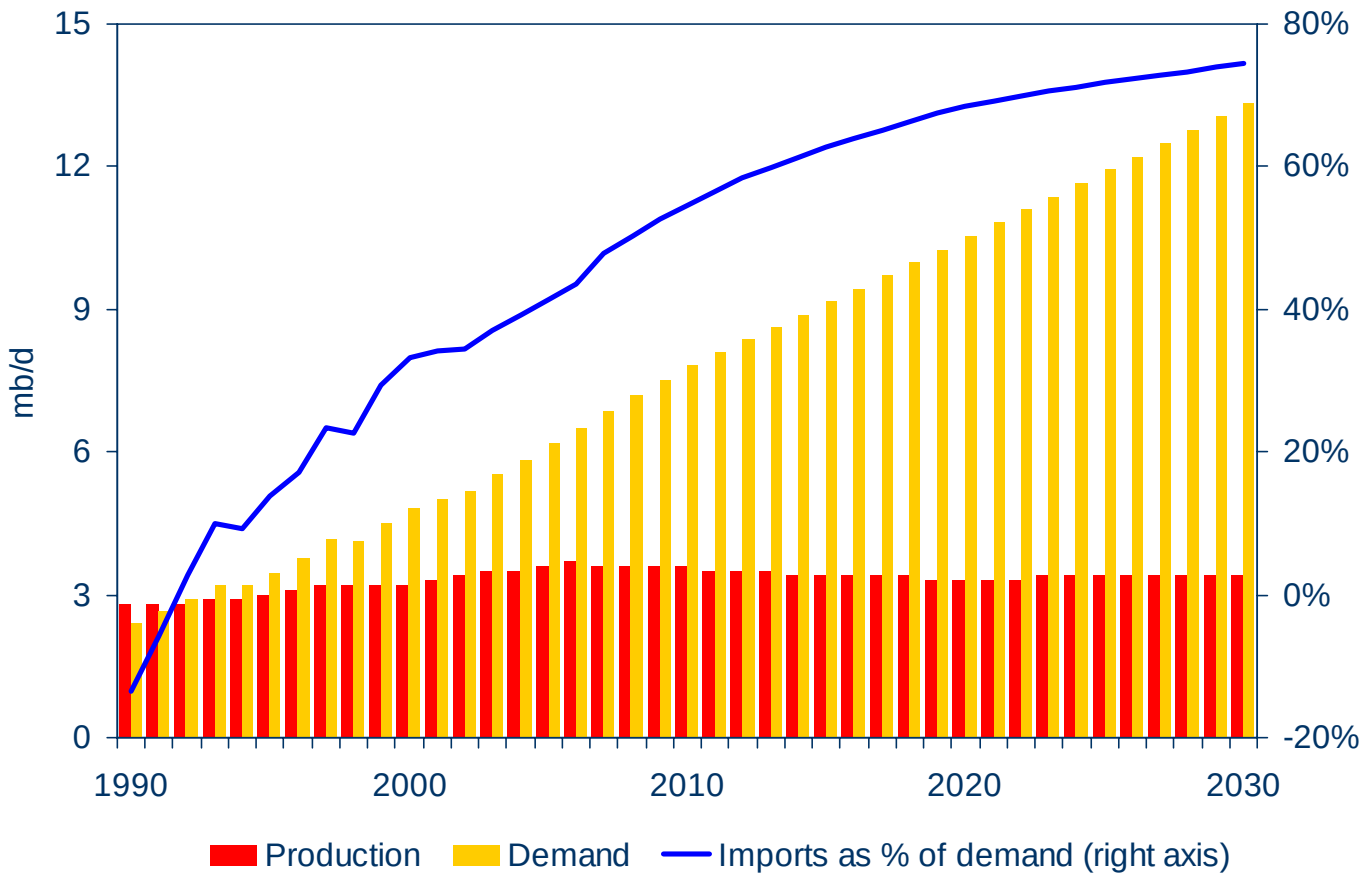
China Oil Supply Balance



China's oil imports will soar from around 2 mb/d now to almost 10 mb/d in 2030 – equal to over 74% of domestic demand

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OECD Asia Energy Trends: Reference Scenario

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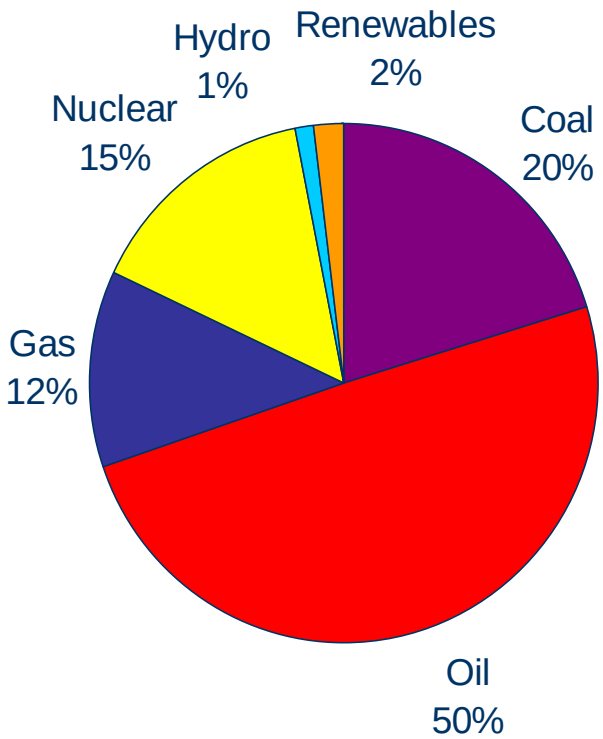
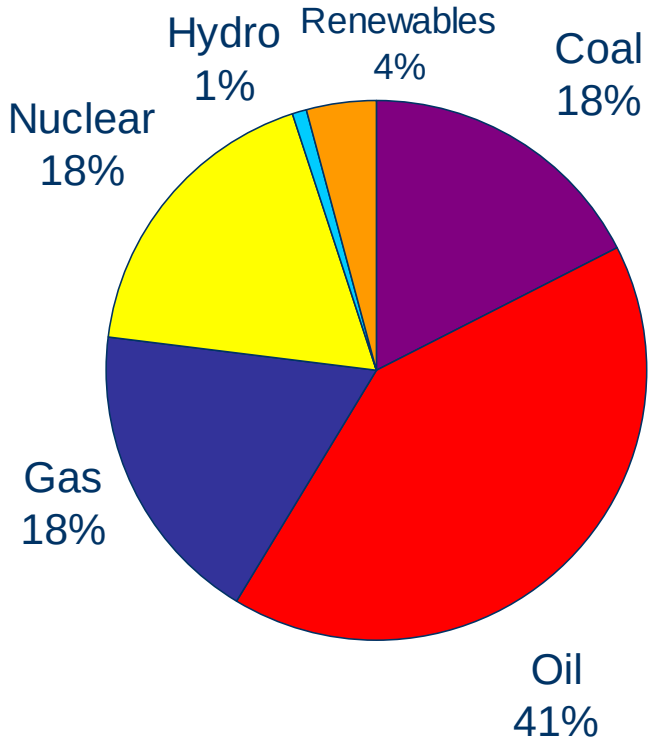
Primary Fuel Mix in Japan & Korea

2002



721 Mtoe

2030



956 Mtoe

Increased use of gas & nuclear for power generation reduces the share of oil & coal in the primary fuel mix

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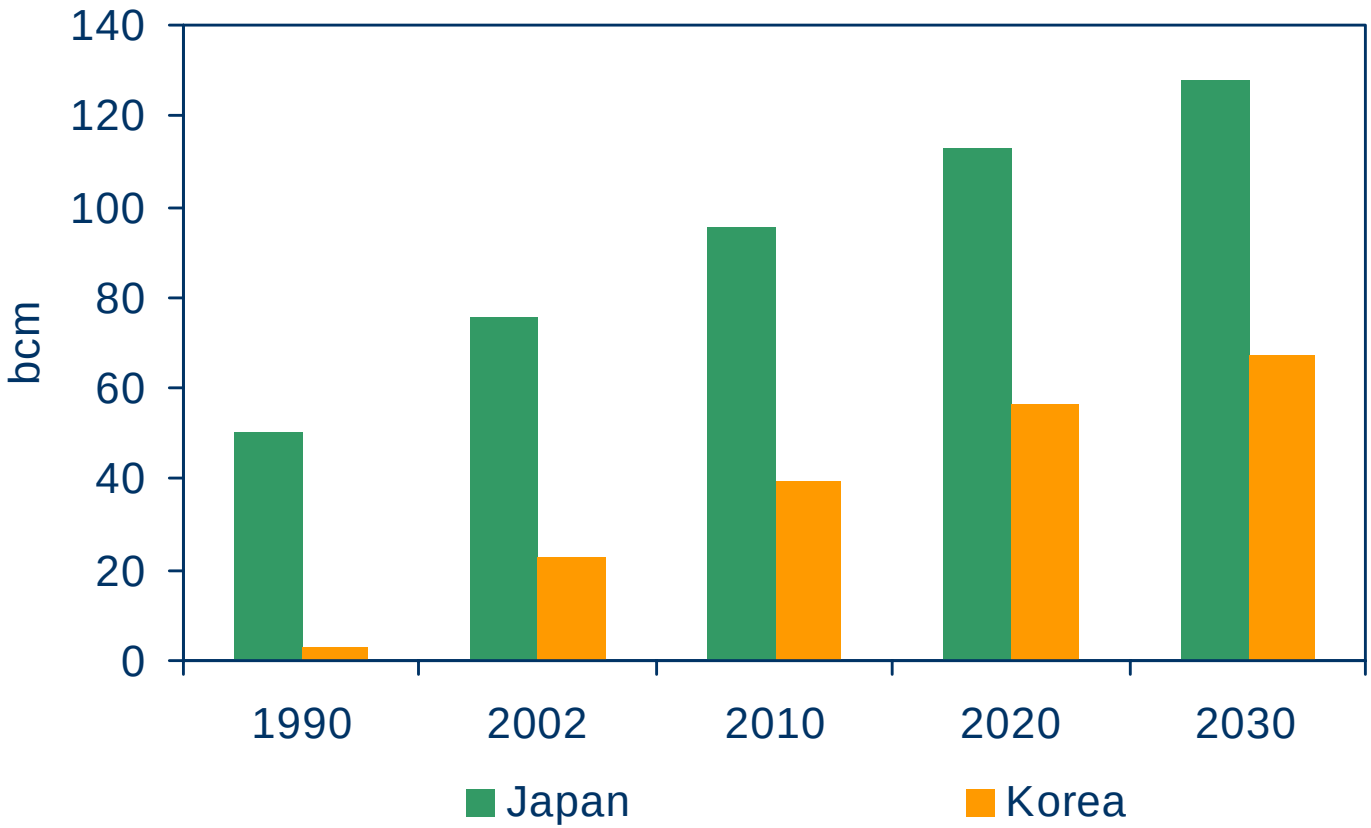
Primary Gas Demand in Japan & Korea



Power generation underpins surging gas use in both Japan & Korea

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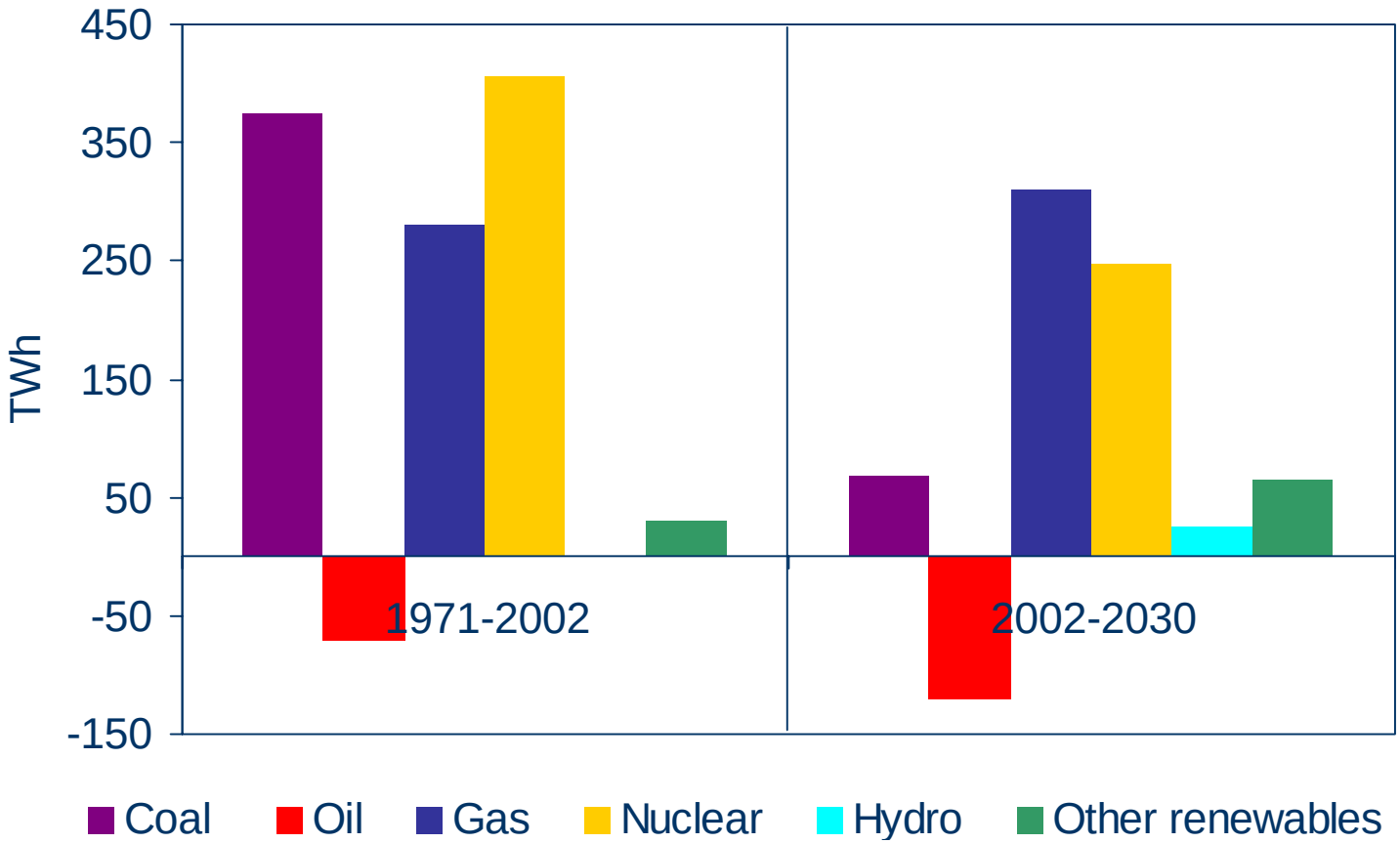
Change in Electricity Generation by Fuel in Japan & Korea



Most new power-generation capacity is gas-fired or nuclear

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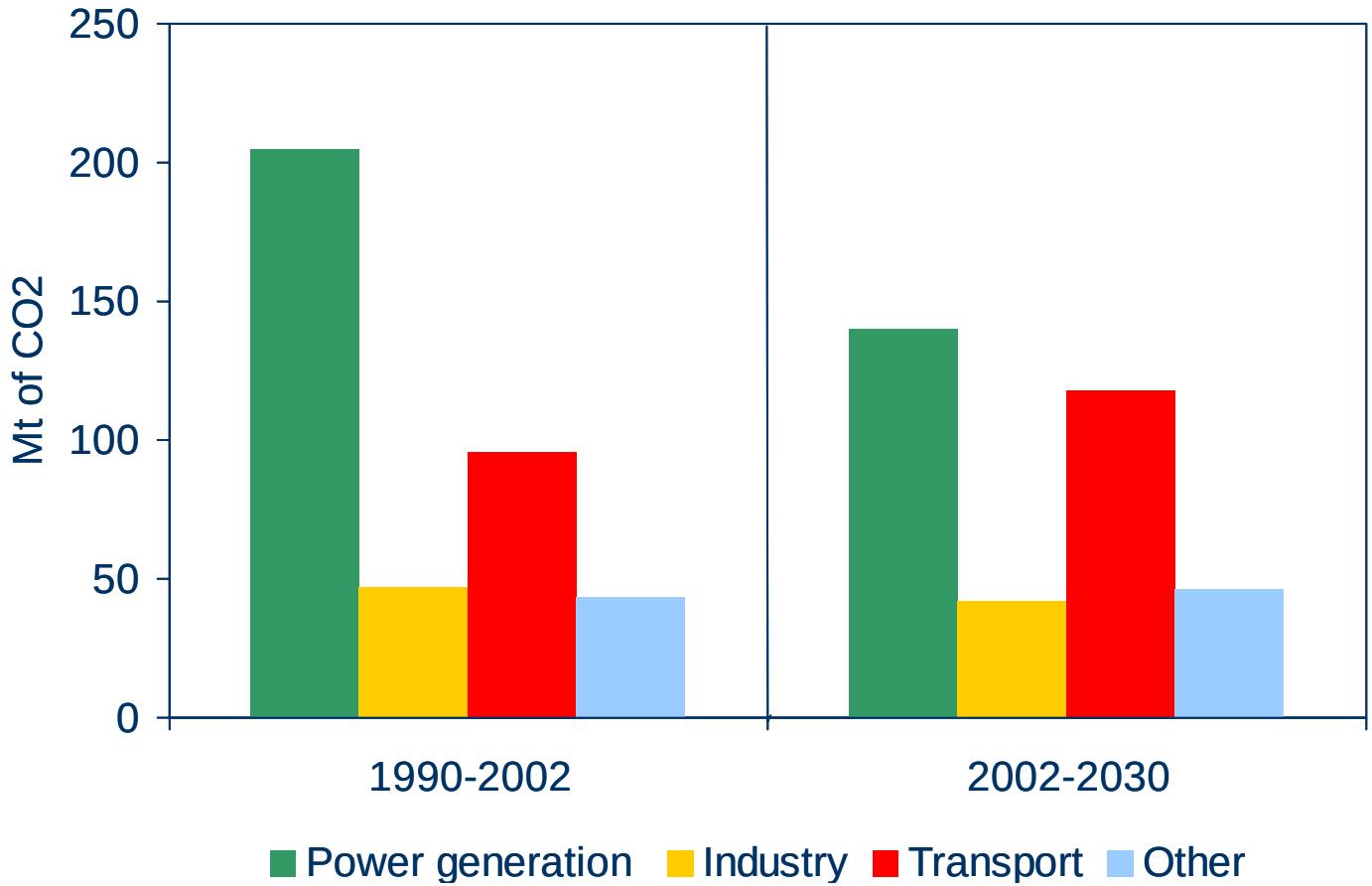
Increase in Energy-Related CO_2 Emissions by Sector in Japan & Korea



Most of the projected increase in emissions comes from power generation & transport in almost equal measure

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Asia-Pacific Energy Trends: Alternative Policy Scenario

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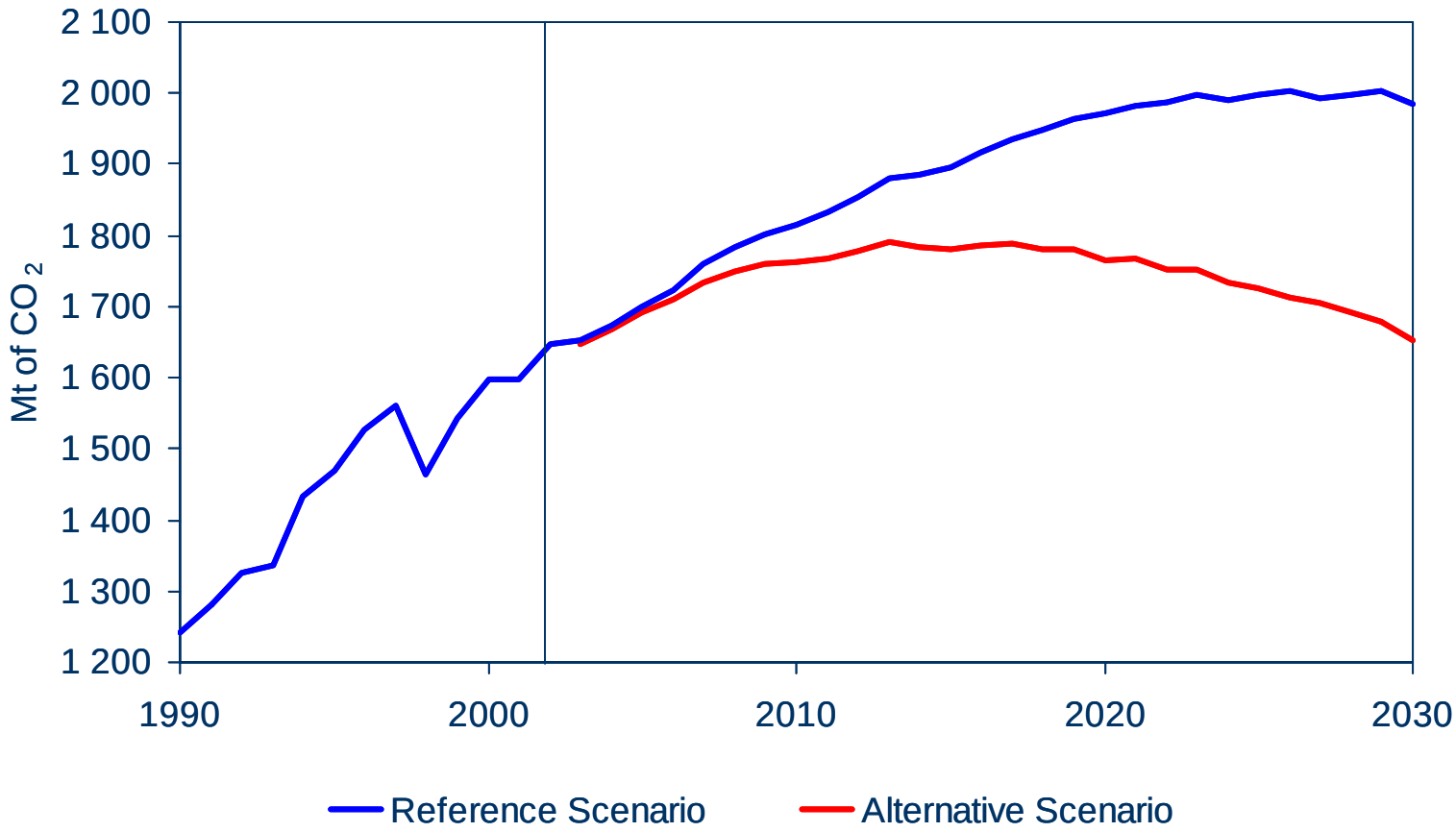
Japan & Korea CO_2 Emissions in the Reference & Alternative Scenarios



With new policies, Japan & Korea stabilise their emissions in the 2010s and drive them back down to 2002 levels by 2030

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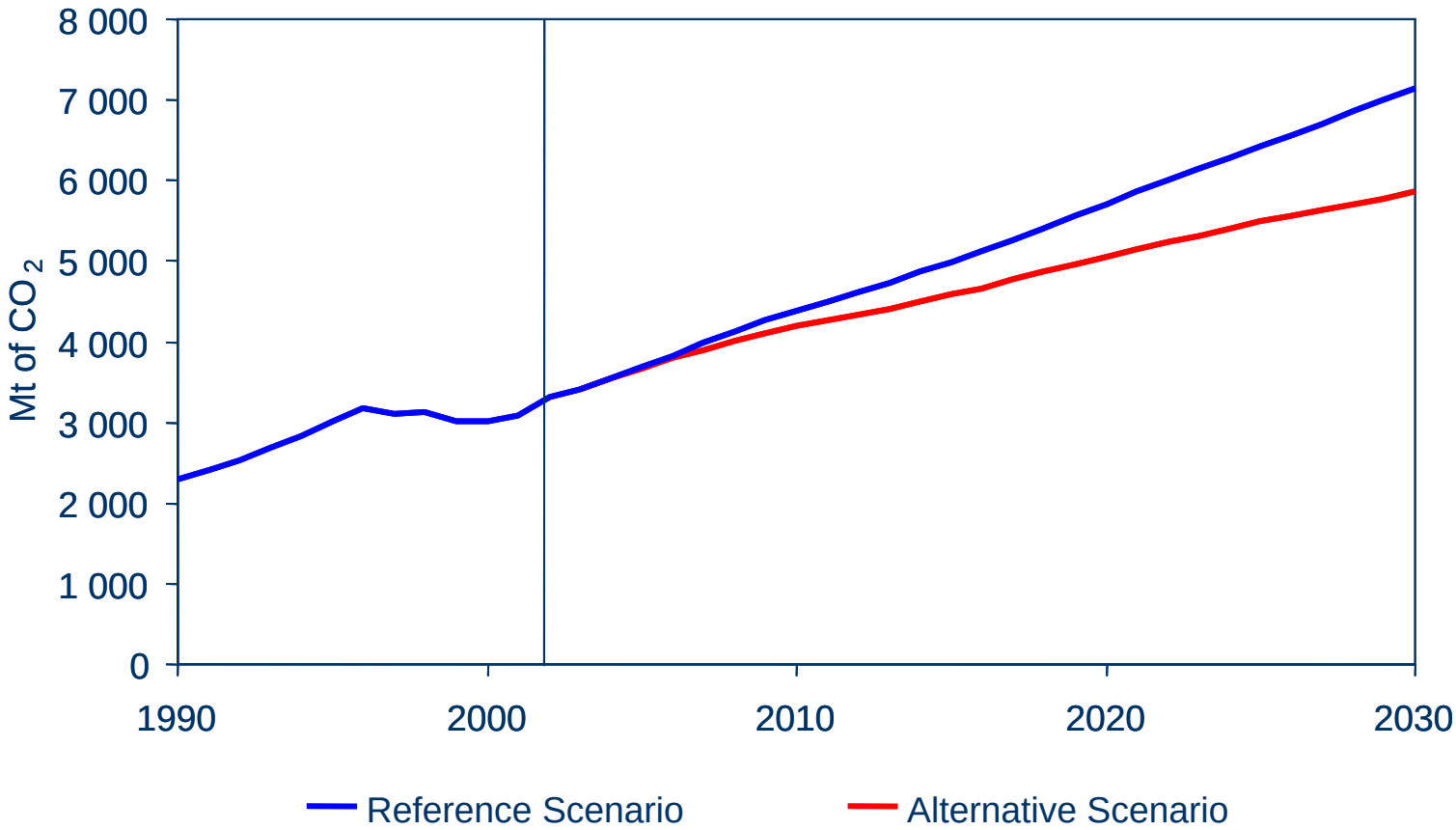
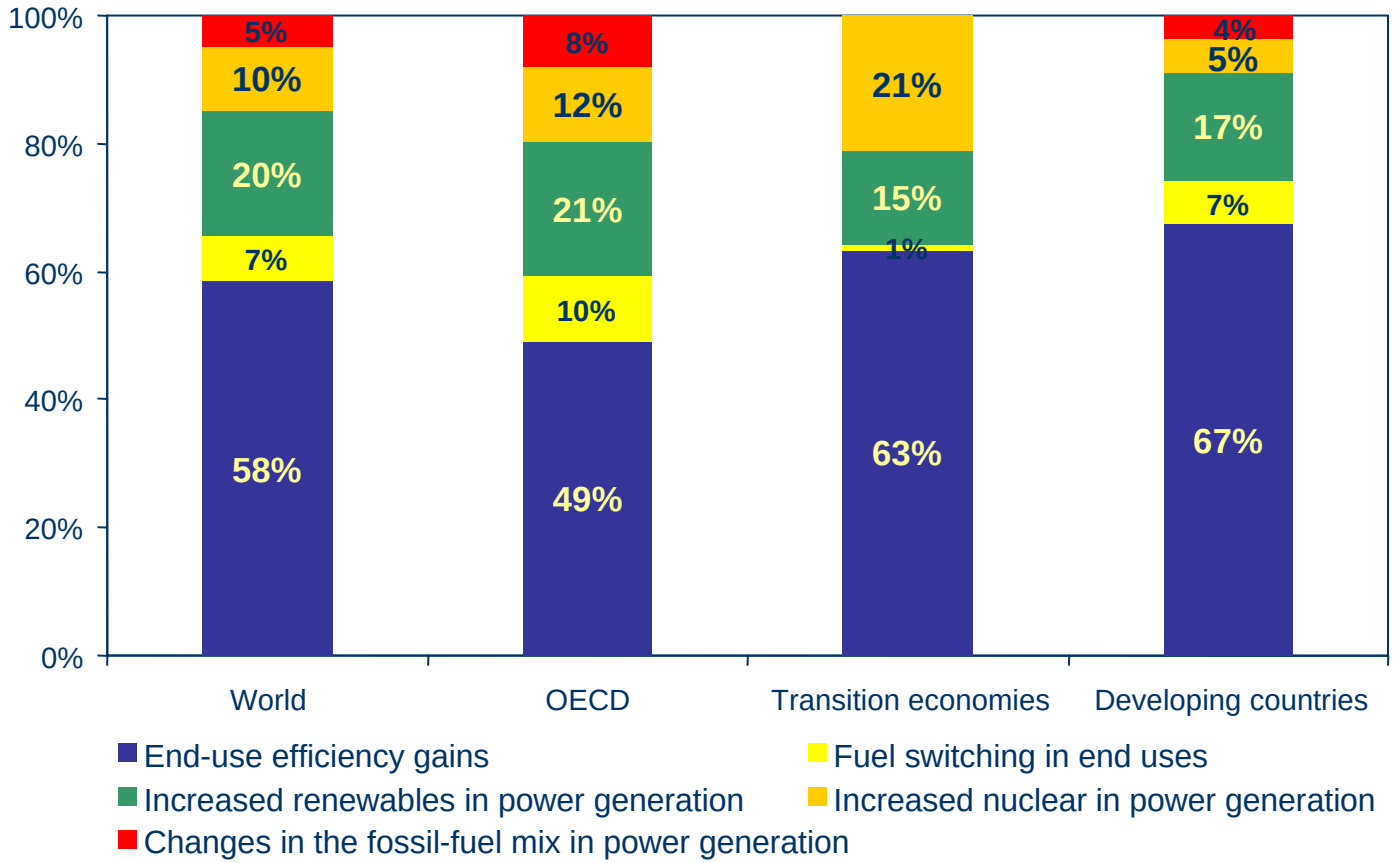
China CO_2 Emissions in the Reference & Alternative Scenarios



With new policies, China could curb its CO_2 emissions by 18% in 2030

Contributory Factors in CO_2 Reduction Alternative vs Reference Scenario 2002-2030



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

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Summary & Conclusions

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Summary & Conclusions (1)

- On current policies, world energy needs will be almost 60% higher in 2030 than now
- Energy resources are more than adequate to meet demand until 2030 & well beyond
- But projected market trends raise serious concerns:
  - Increased vulnerability to supply disruptions
  - Rising CO_2 emissions
  - Huge energy-investment needs
  - Persistent energy poverty
- More vigorous policies would curb rate of increase in energy demand & emissions significantly
- But a truly sustainable energy system will call for faster technology development & deployment
- Urgent & decisive government action is needed

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Summary & Conclusions (2)

- Asia's importance to world energy markets – and its share in CO_2 emissions - will continue to grow
  - Most of the region's incremental demand & emissions will come from developing Asia – notably China & India
  - Energy demand will grow much more slowly in Japan & Korea
- Net imports of oil & gas – and reliance on key chokepoints - will continue to grow
- New policies would reverse the rising emissions trend in OECD Asia, but not in developing Asia