INTERNATIONAL ENERGY AGENCY

WORLD ENERGY INVESTMENT OUTLOOK

North American Energy Investment Challenges

2003 INSIGHTS

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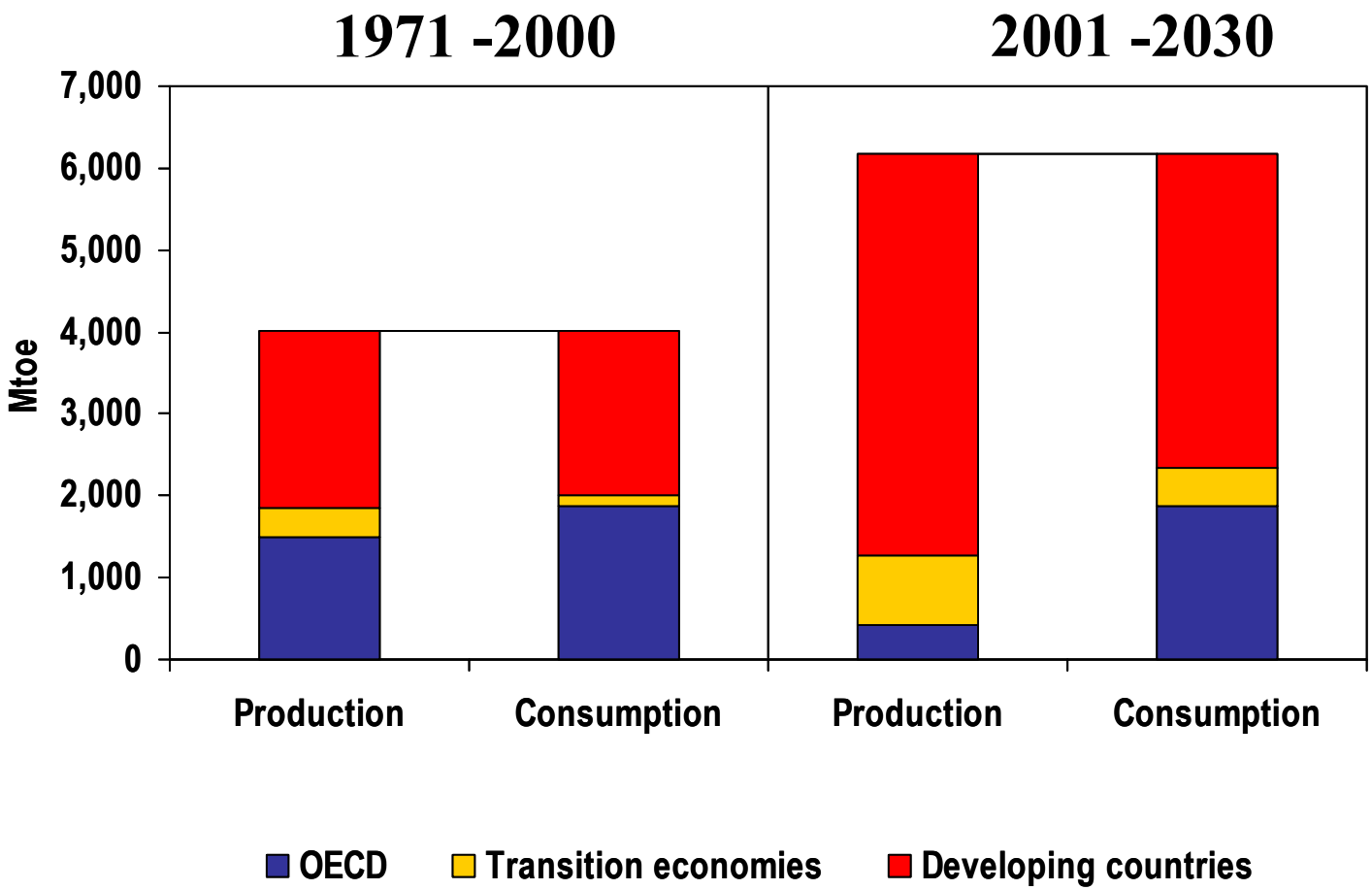
Increase in World Energy Production and Consumption



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

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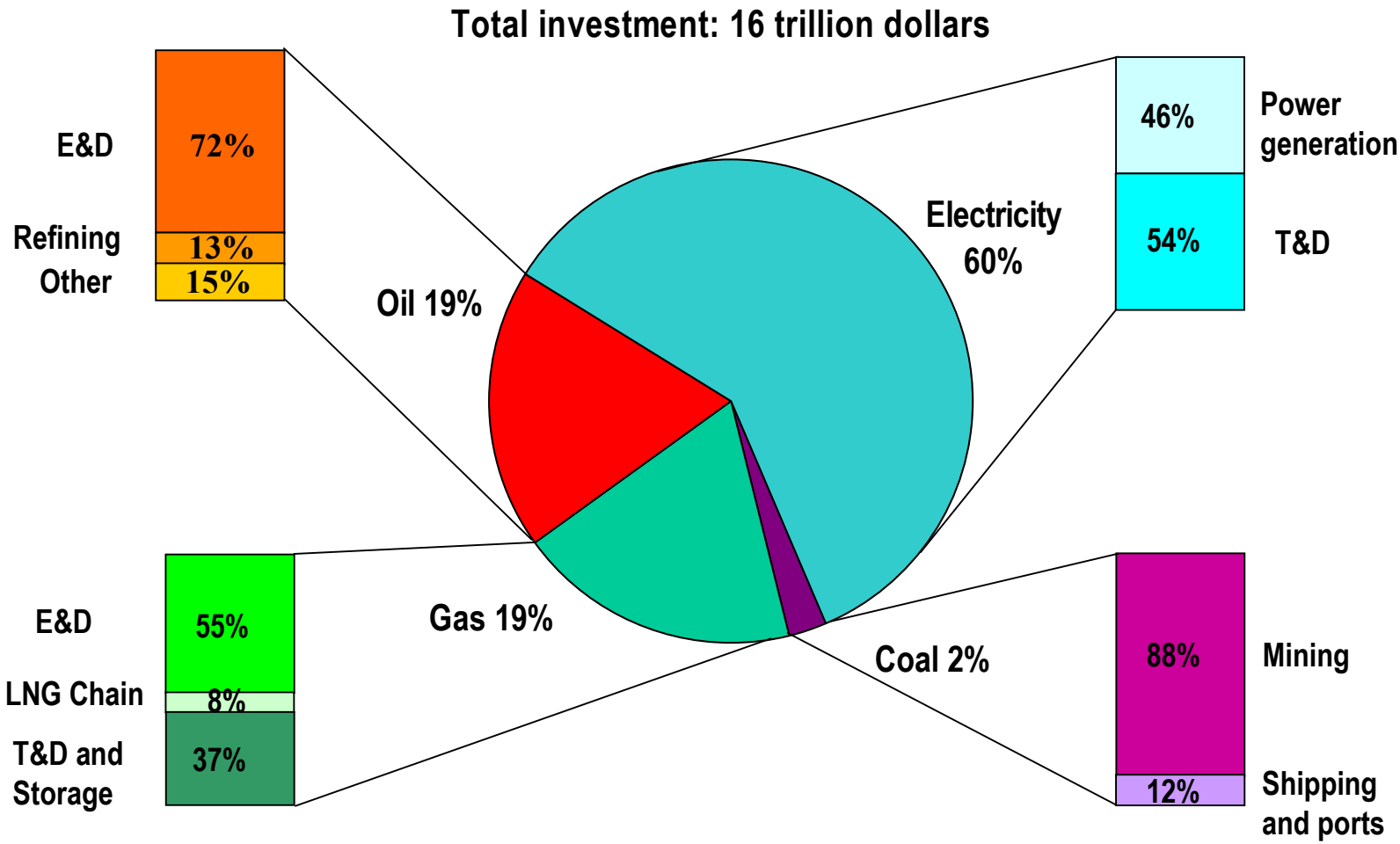
World Energy Investment

2001-2030



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

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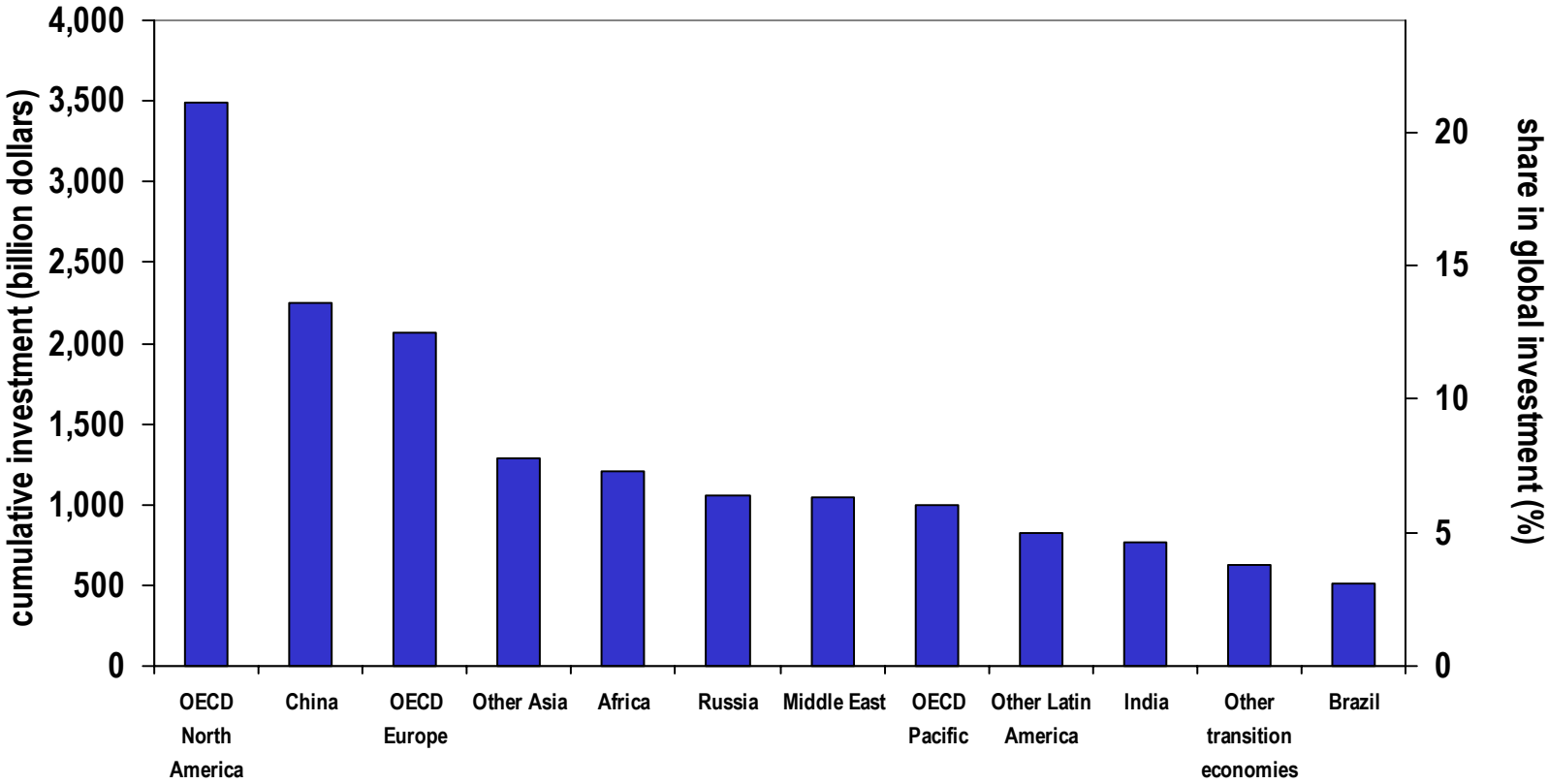
Energy Investment by Region
2001-2030



OECD North America will account for over a fifth of global energy investment needs of $16 trillion – more than any other region

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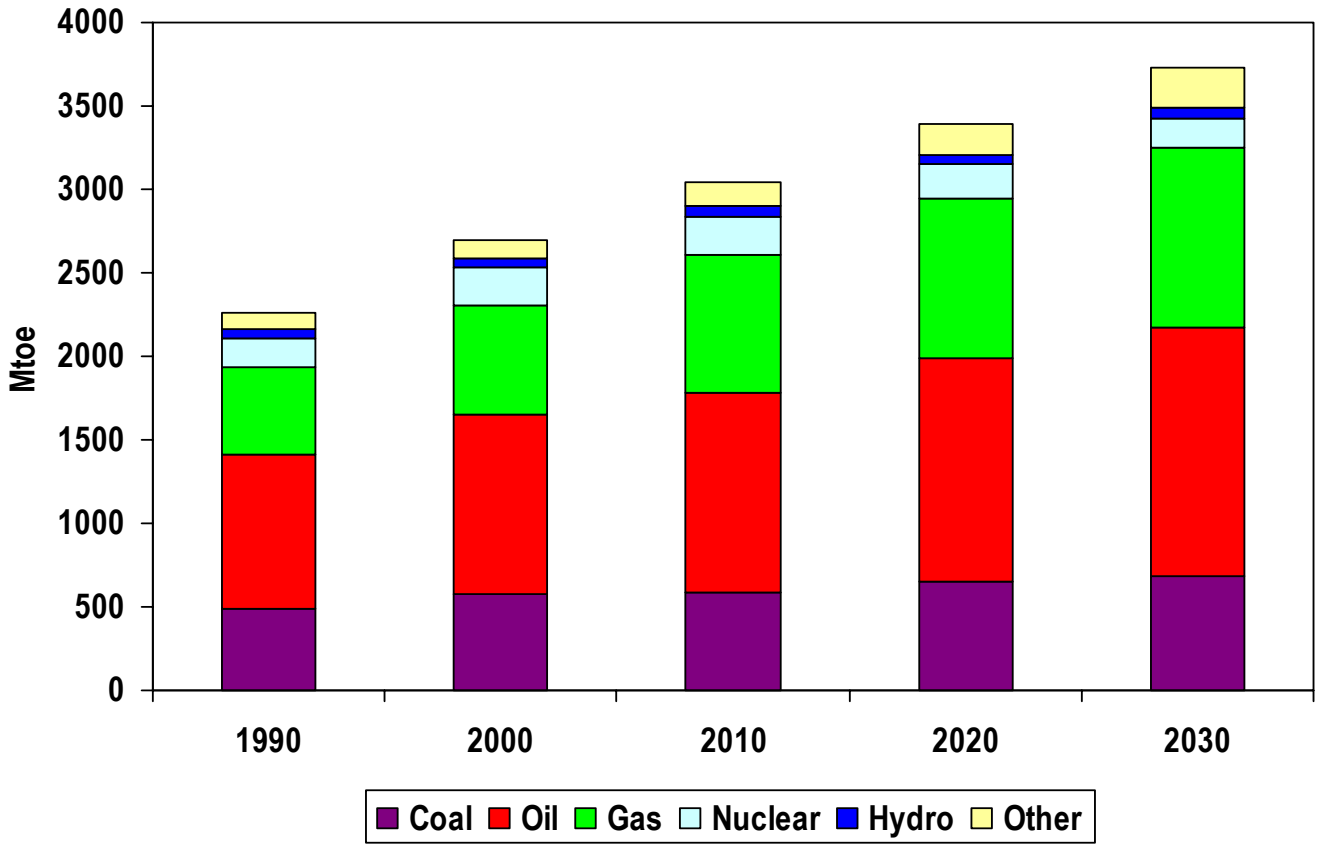
OECD North American Primary Energy Supply



The shares of natural gas and renewables in the primary fuel mix increases most – driven by rising power-generation demand

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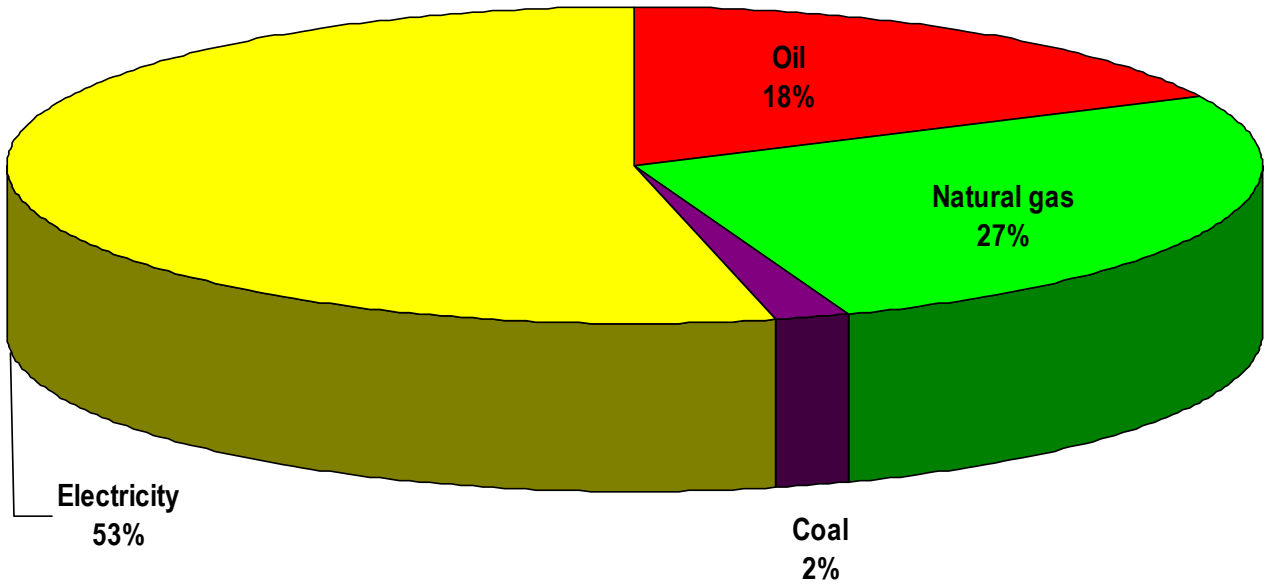
OECD North American Energy Investment by Fuel
2001-2030



Cumulative investment = $3.5 trillion

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

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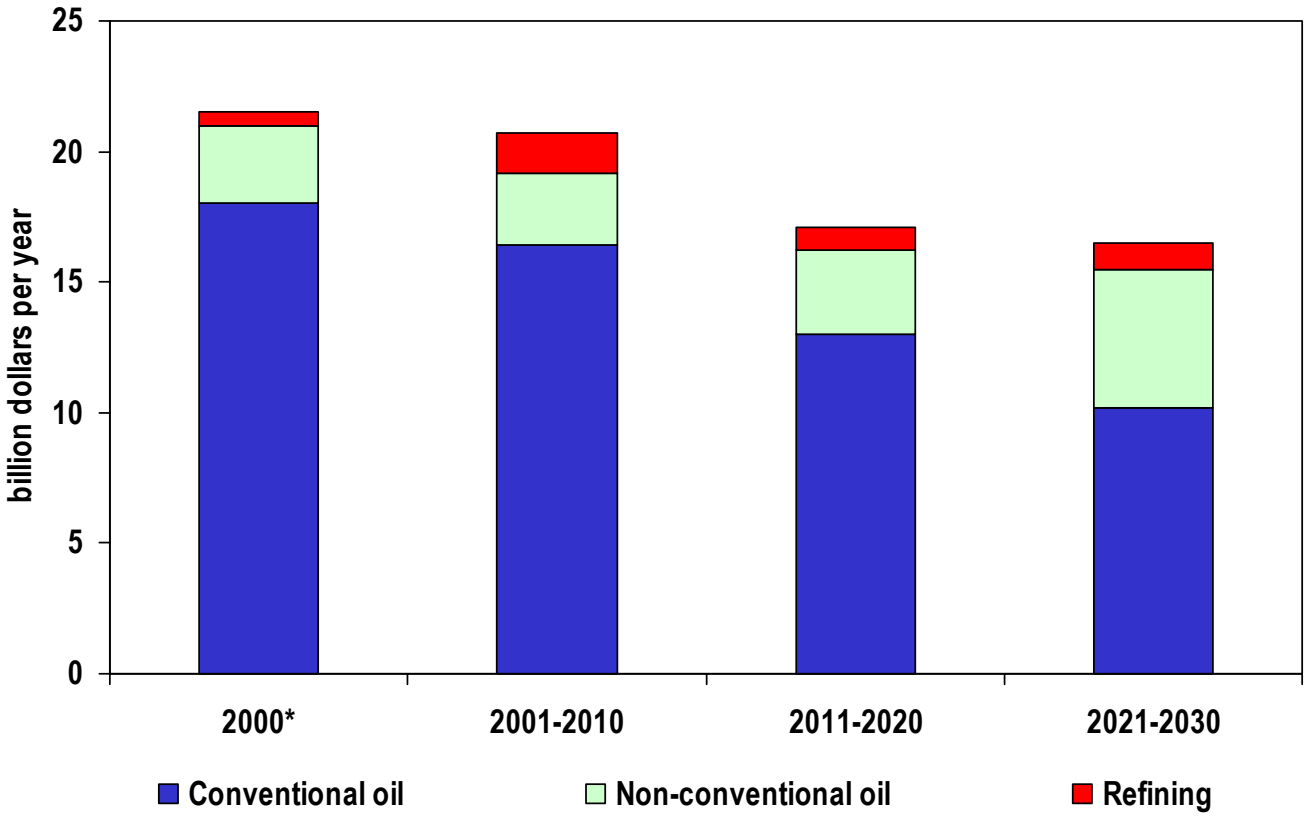
Oil Investment in the U.S. & Canada



Conventional oil investment will decline as rising costs deter drilling, partly offset by rising non-conventional spending – mainly in Canada

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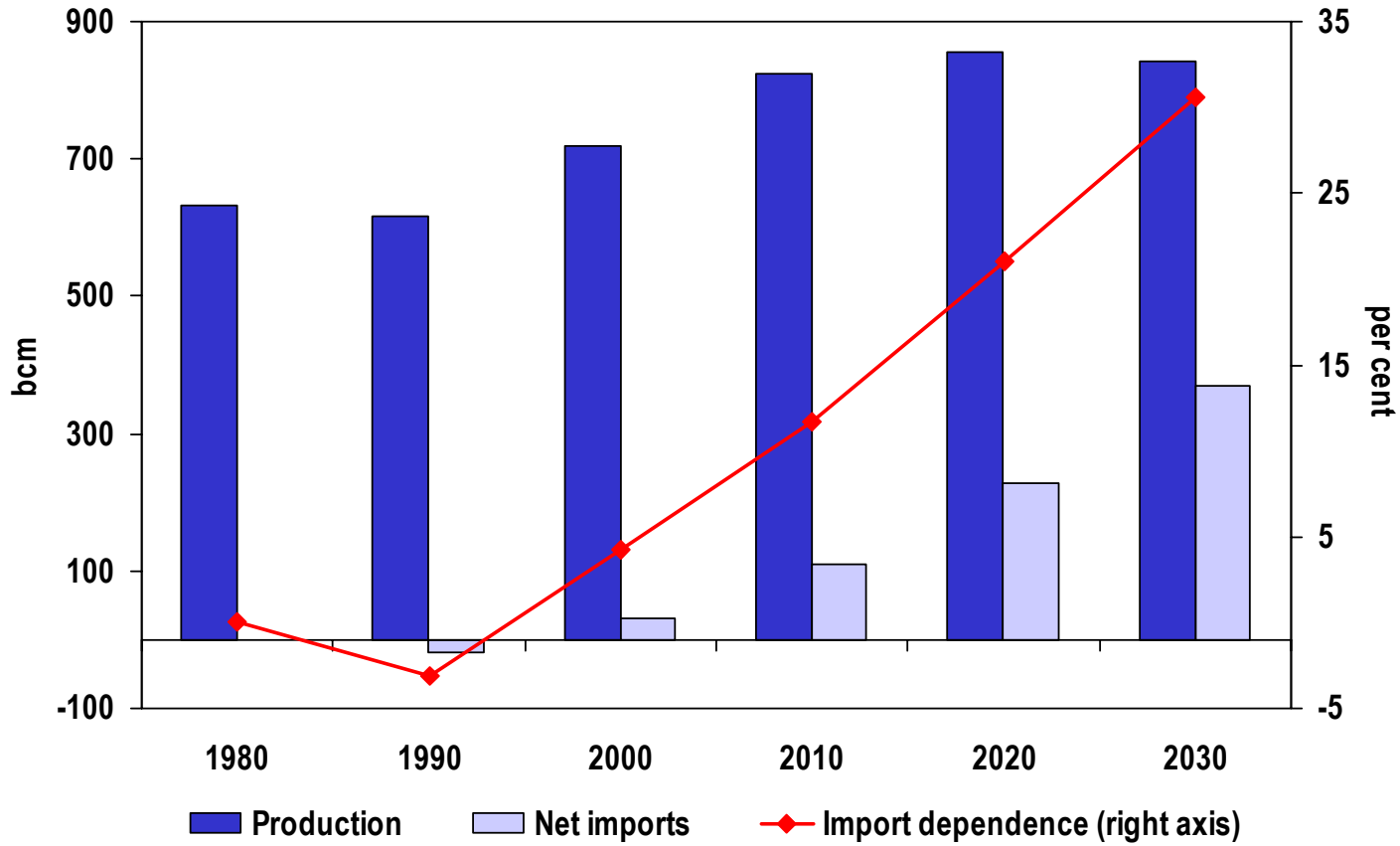
Gas Supply in the U.S. & Canada



A rapidly growing share of net gas supply will come from LNG imports – either directly or via Mexico or Bahamas

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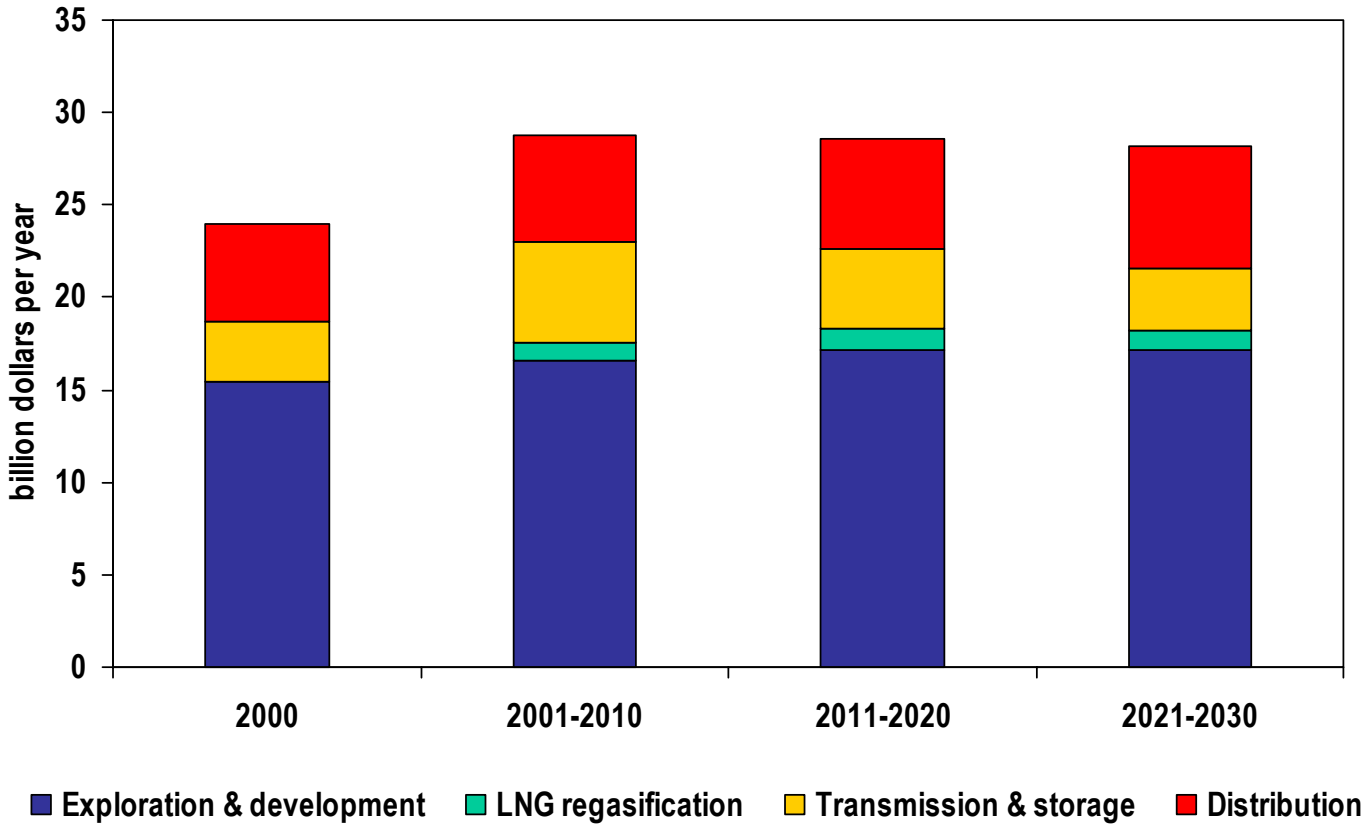
Gas Investment in U.S. & Canada



E&D will remain the largest component of gas investment, though LNG regasification terminals will claim a significant share

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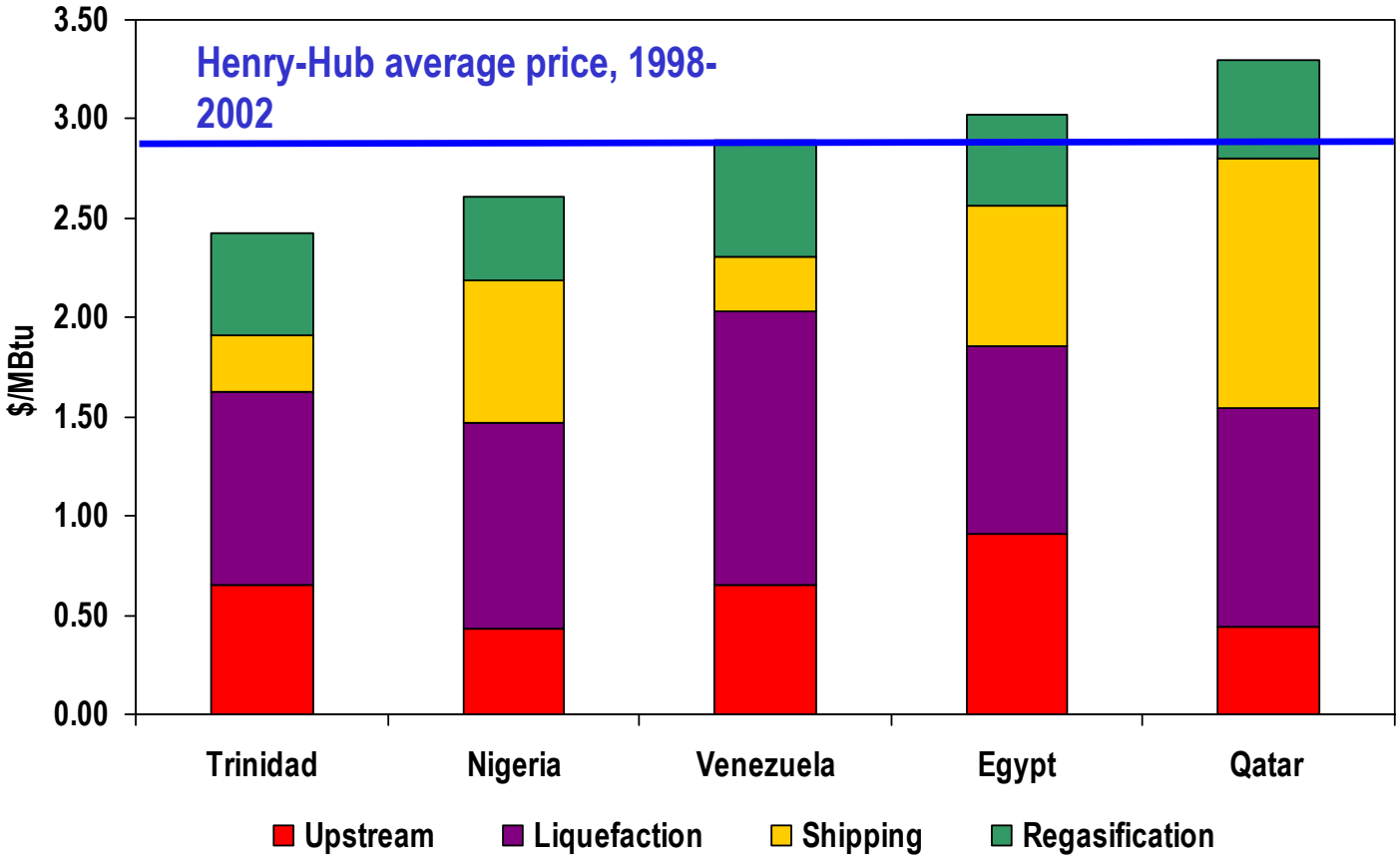
Levelised Cost of LNG Imports into U.S. Gulf Coast



Lower capital costs are making LNG imports more economic – and more competitive with domestic supply projects

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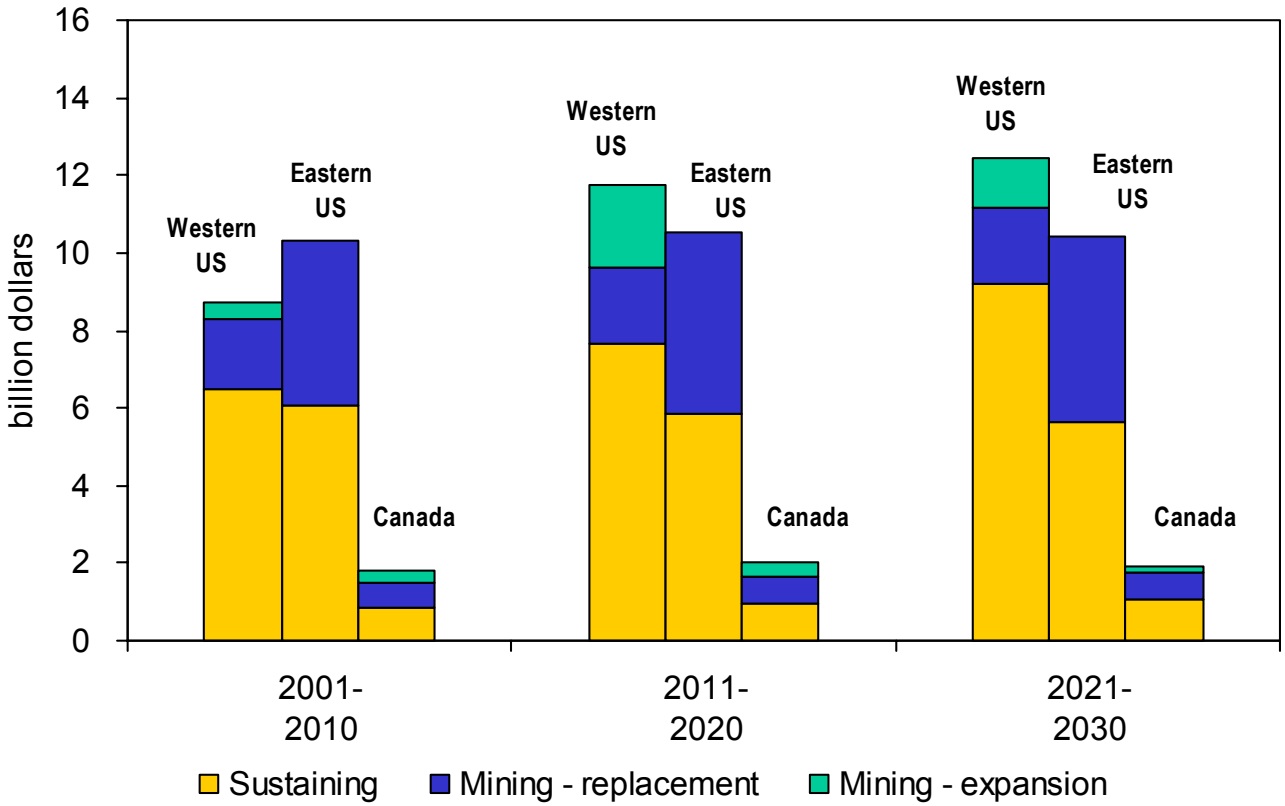
Coal Investment in the U.S. & Canada by Region



Sustaining production capacity at existing mines will continue to claim the largest share of coal-industry investment in all regions

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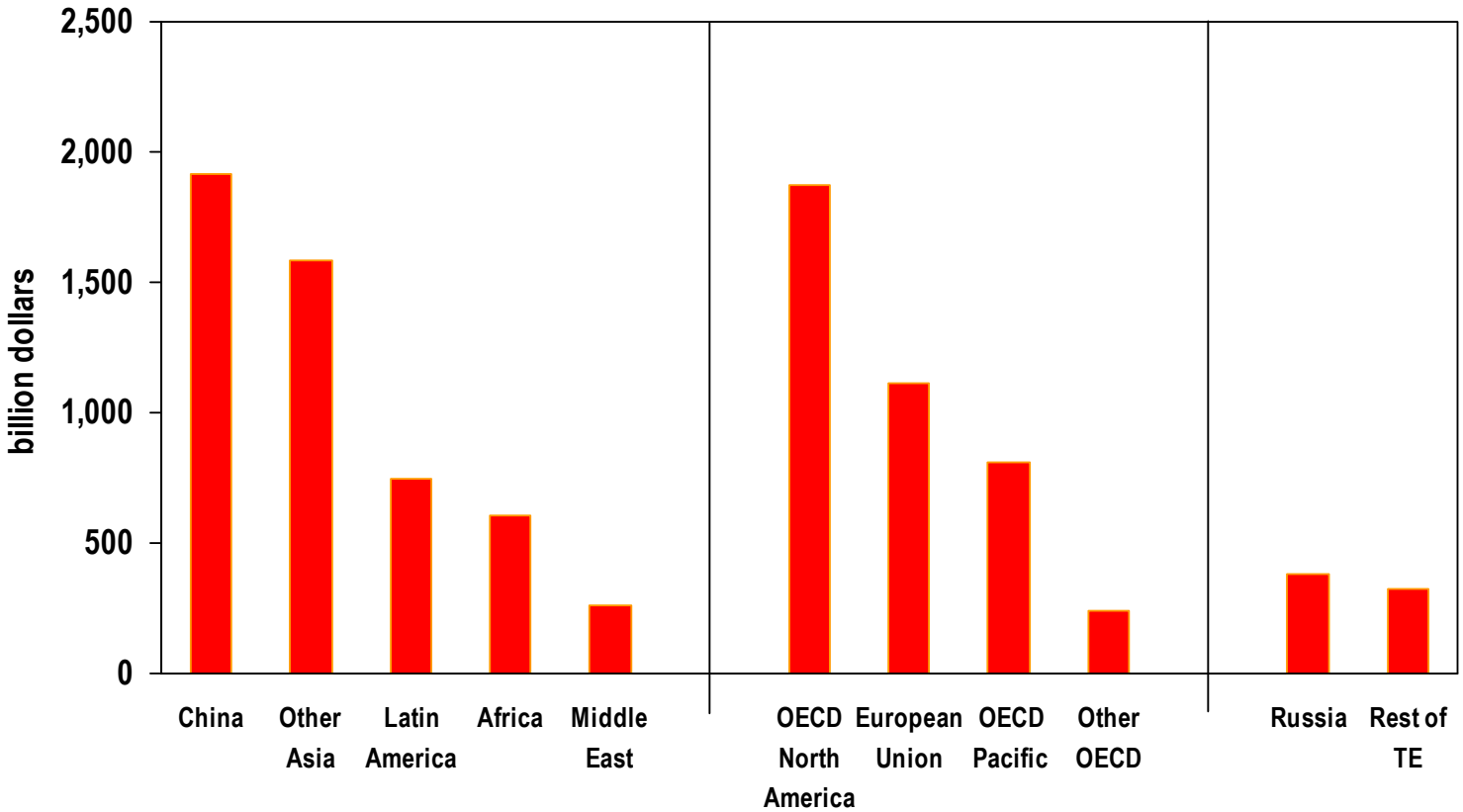
Electricity Sector Investment by Region

2001-2030



OECD North America will need more electricity investment than any other country or region bar China

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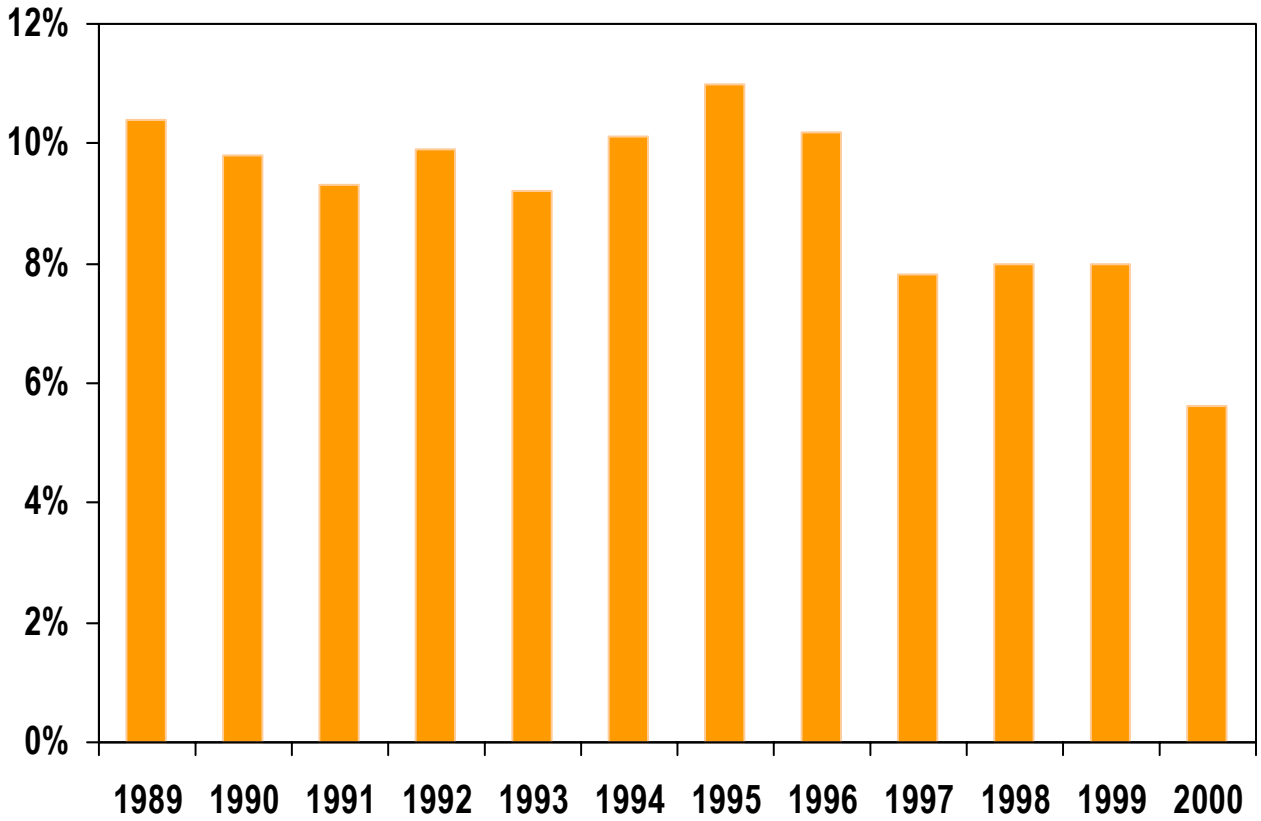
U.S. Privately Owned Utilities Profit Margin



Profit margins have fallen sharply in recent years

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Electricity Investment Uncertainties and Challenges

- Investment needs will increase over next 3 decades
  - Demand growth of 1.6%
  - Many old plants – including most nuclear reactors – will be retired
  - Shift to higher unit cost renewables
  - Tightening reserve margins
- Gas prices and capital costs of coal stations & renewables are key drivers of future investment in generation
- Wind power will be primary renewable source – calling for investment in voltage regulation & network reinforcement
- New capacity investment may be delayed as investors wait to see what environmental policies – including possible climate action – are enacted
- Higher investment costs for new capacity may delay decommissioning of old plants and raise emissions

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Energy Challenges Facing North America

- $3.5 trillion of energy investment needed in OECD North America through 2030 – more than half in or for the electricity sector
- Prices will need to be high enough to support capital flows
- Decline rates & drilling costs very uncertain for oil & gas
- Liberalisation not expected to undermine investment, but some concerns about reliability & peak electricity capacity
- Changing environmental policies are a risk to investors and a source of uncertainty for future investment
  - New measures to boost renewables and save energy
  - New coal-fired plants discouraged by threat of new measures

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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