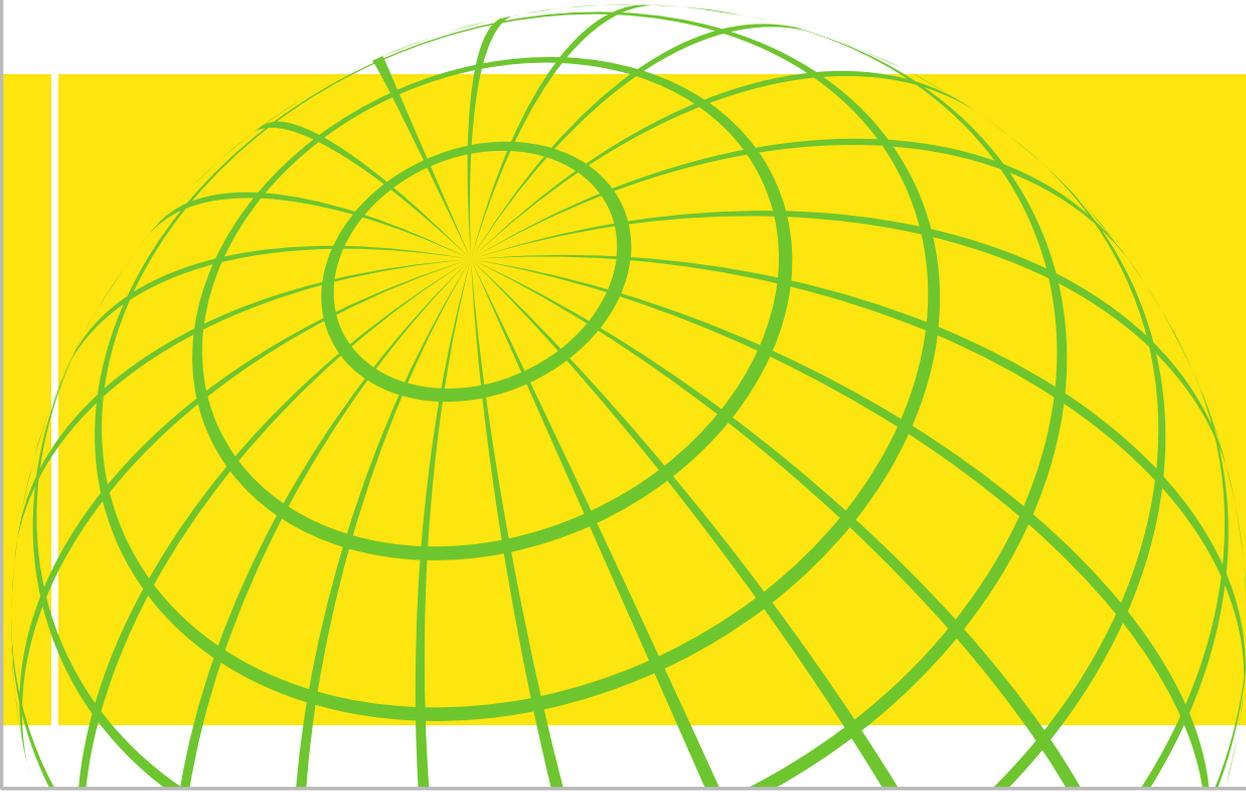


January 2013

BP Energy Outlook 2030

Christof Rühl, Group Chief Economist





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Population, income and energy growth

Population

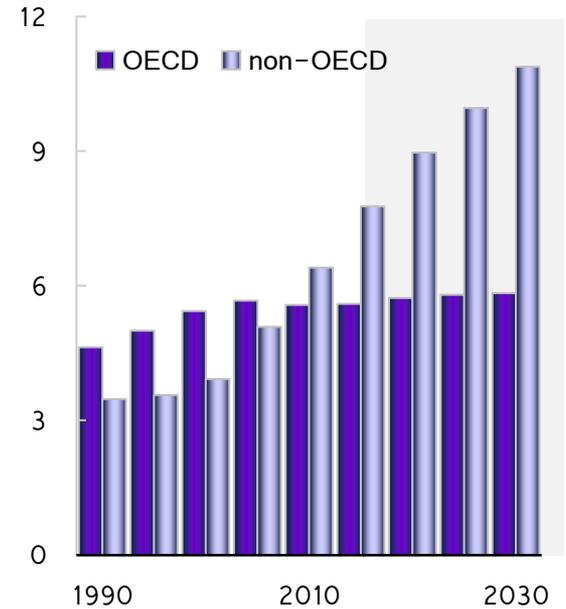
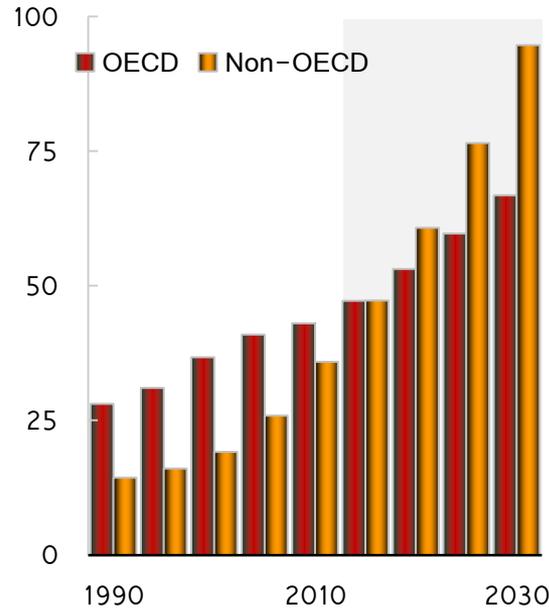
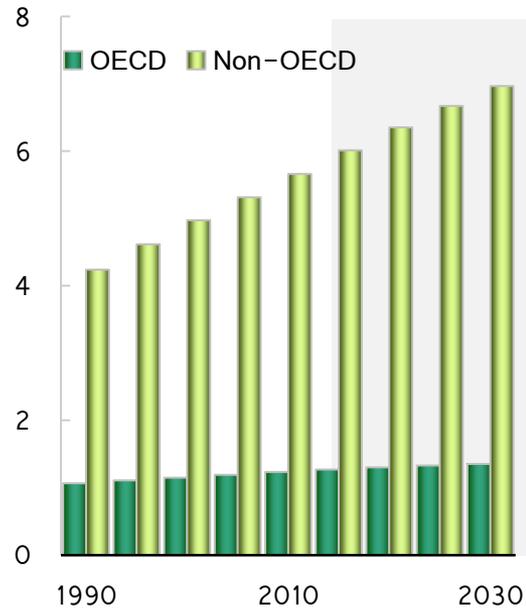
GDP

Primary energy

Billion

Trillion \$2011 PPP

Billion toe



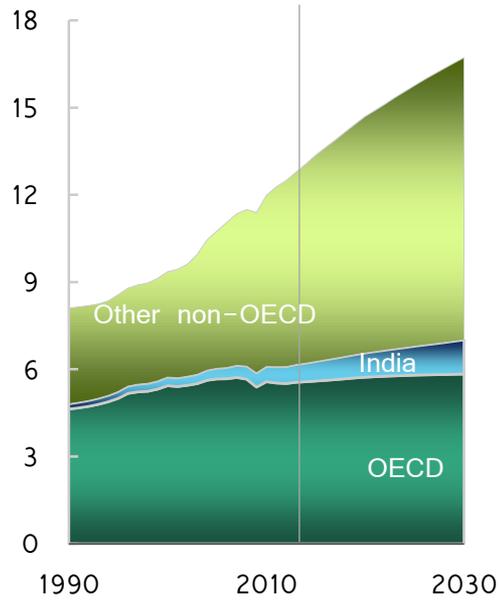
Industrialisation drives energy growth

By region

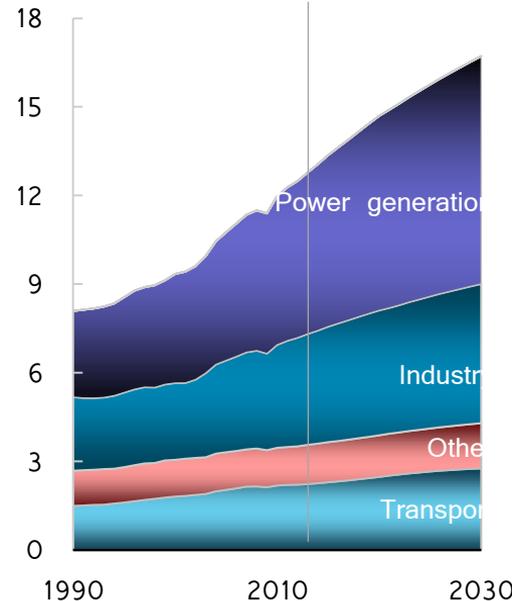
By primary use

By fuel

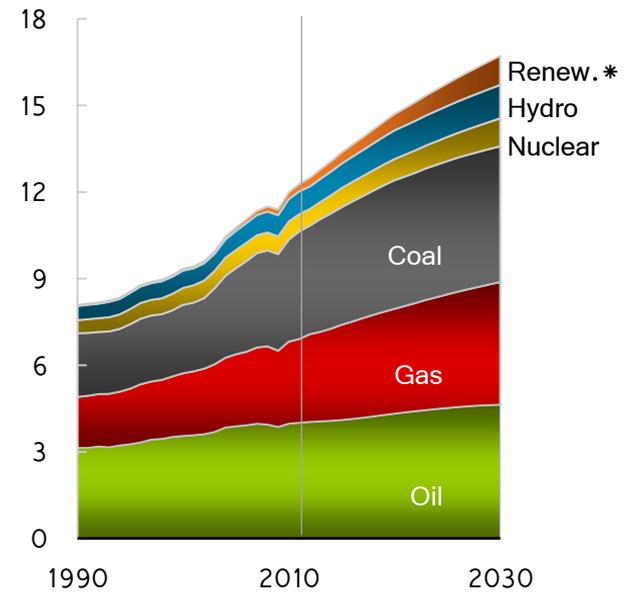
Billion toe



Billion toe



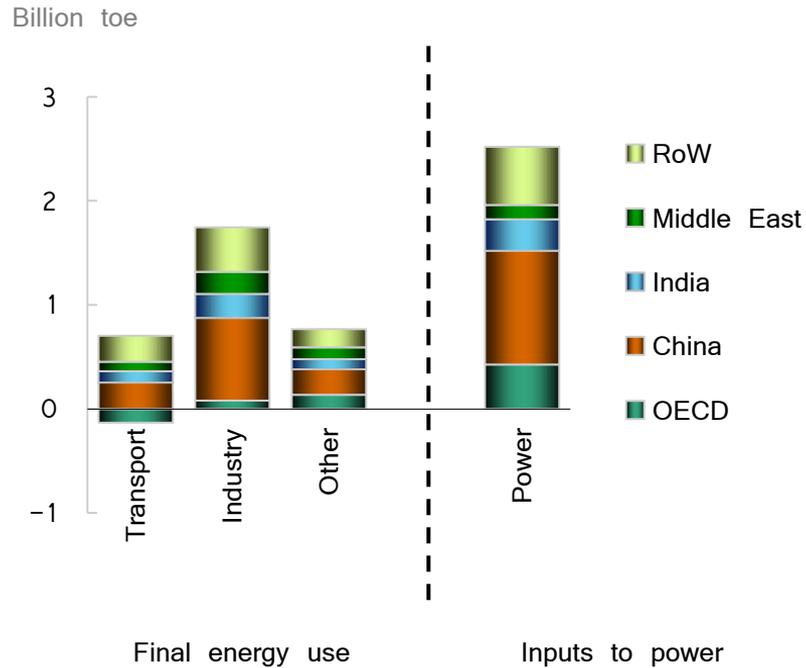
Billion toe



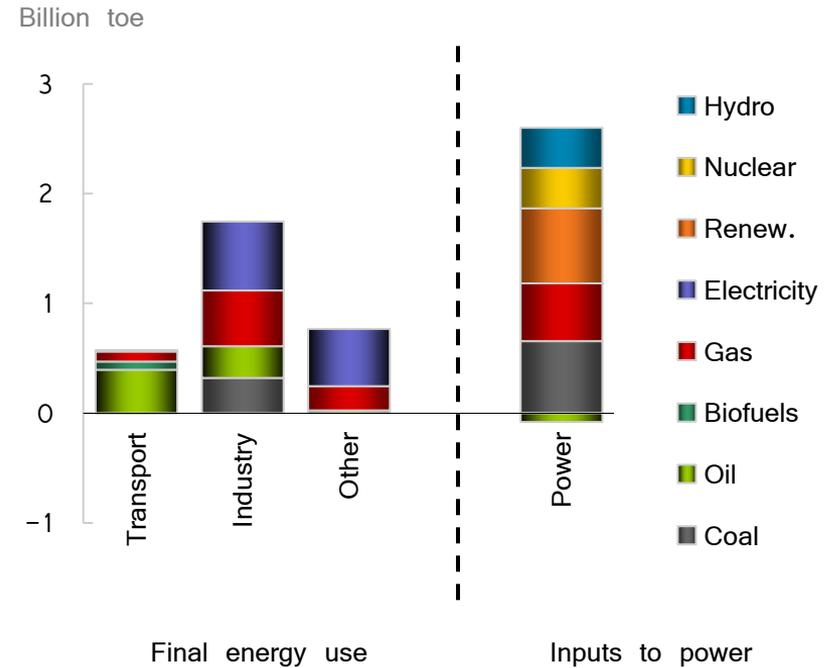
*Includes biofuels

The power sector leads primary energy growth

Growth by sector and region, 2011–2030

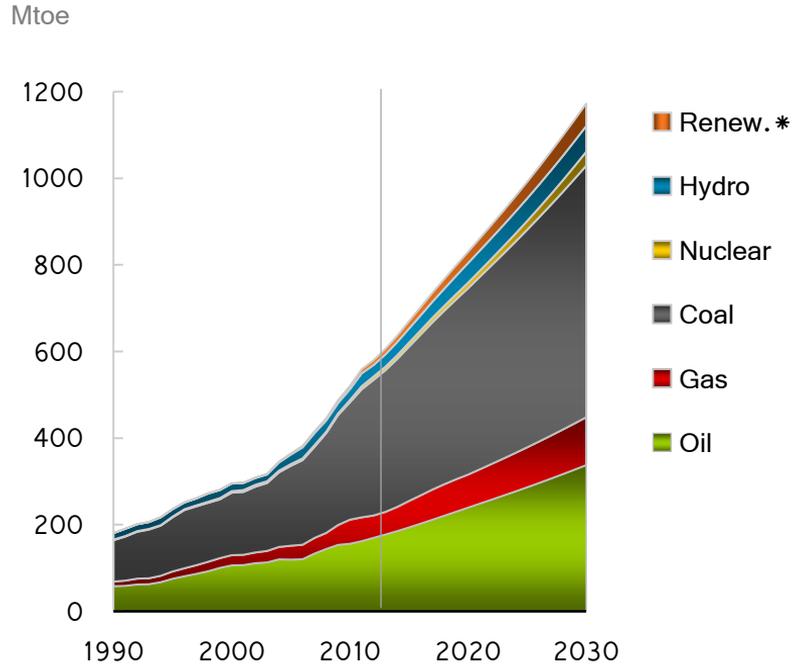


Growth by sector and fuel, 2011–2030

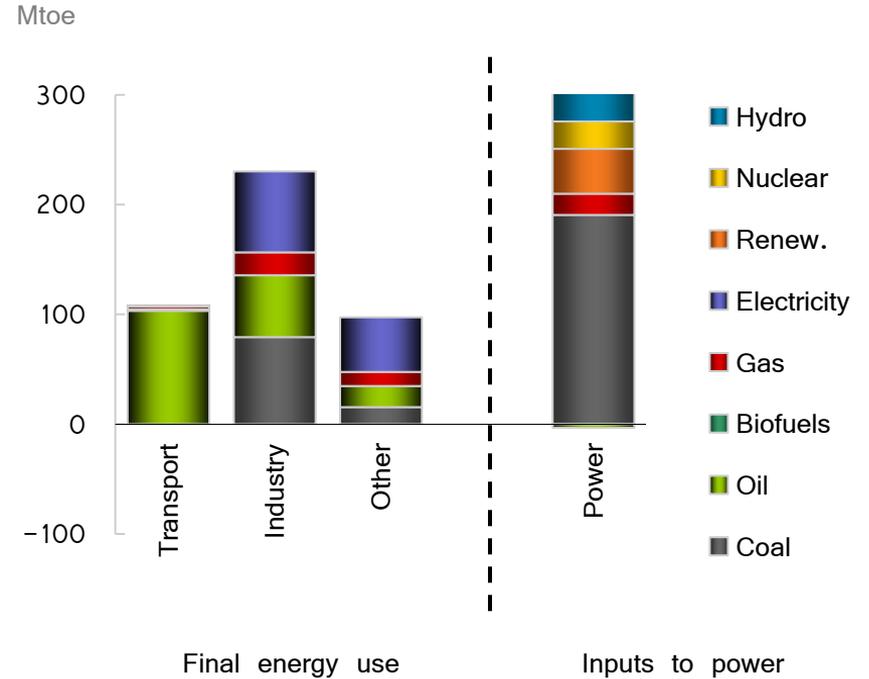


India

Primary energy demand by fuel



Growth by sector and fuel, 2011-2030

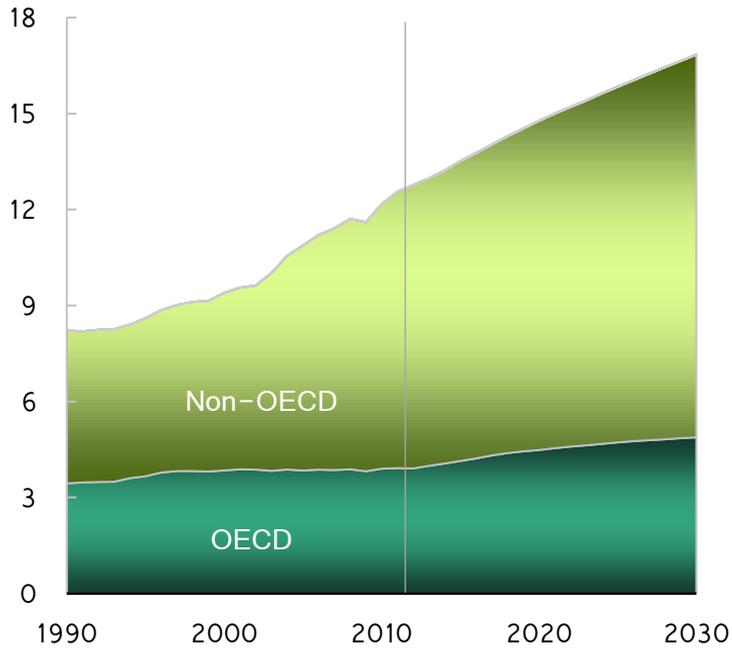


*Includes biofuels

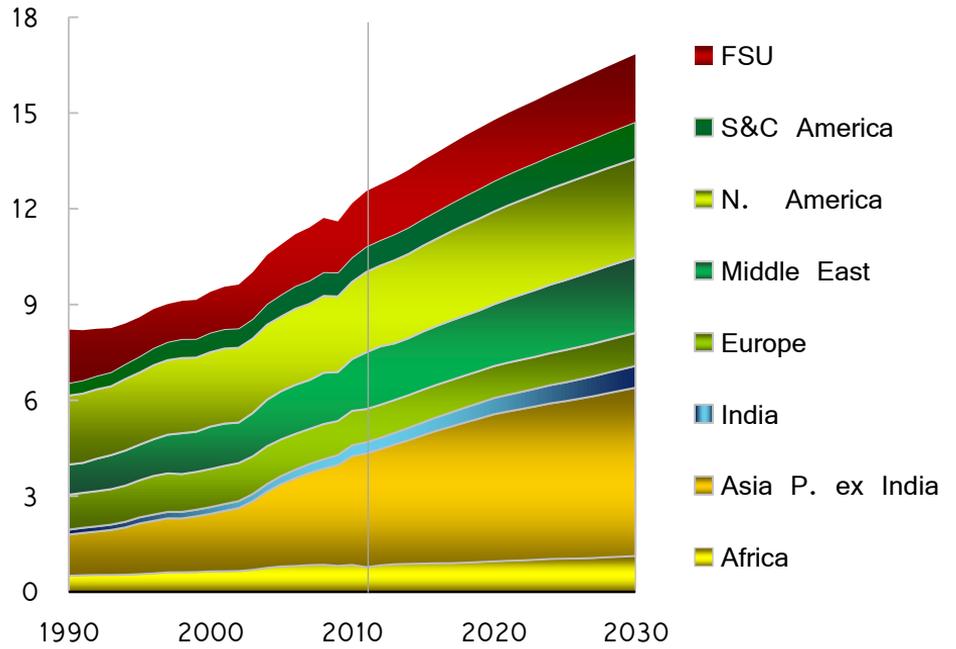


Emerging economies dominate energy production

Billion toe

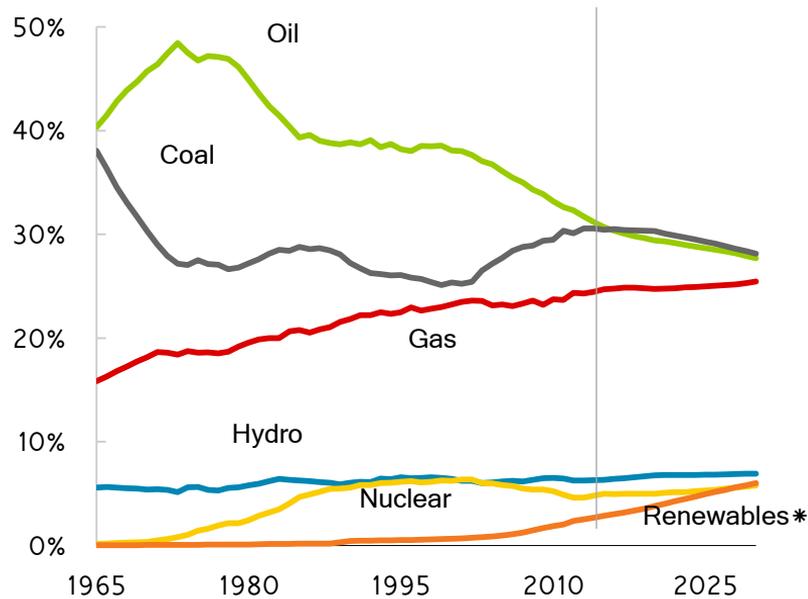


Billion toe



Fuel shares and energy prices

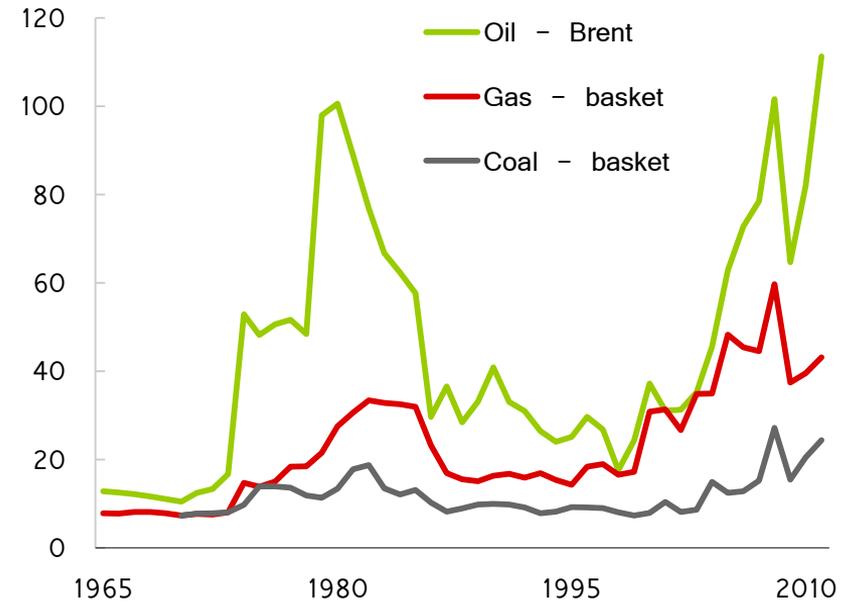
Shares of world primary energy



*Includes biofuels

Energy prices

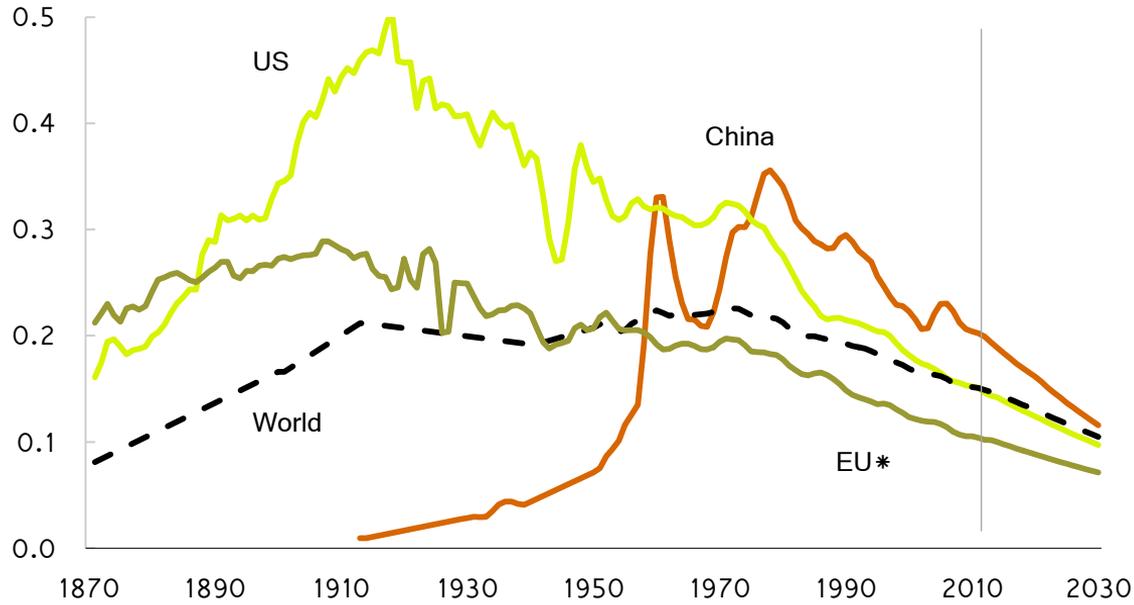
\$2011/boe



Energy efficiency improvements

Energy intensity by region

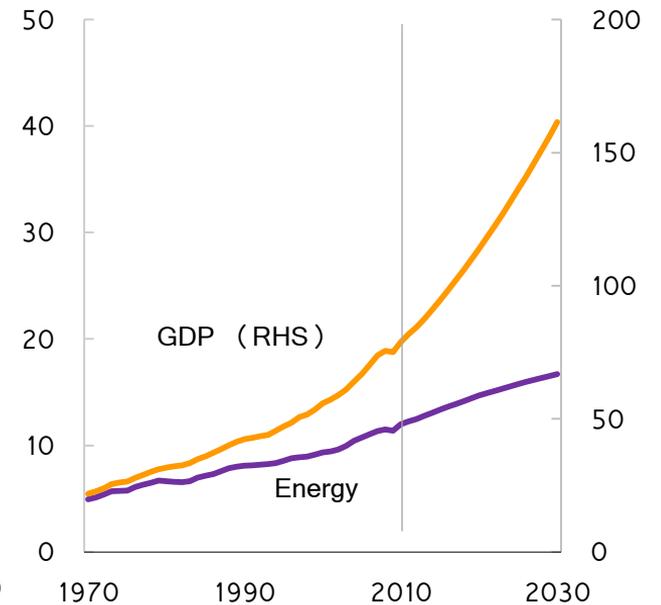
Toe per thousand \$2011 GDP (PPP)



Energy and GDP

Billion toe

Trillion \$2011 (PPP)



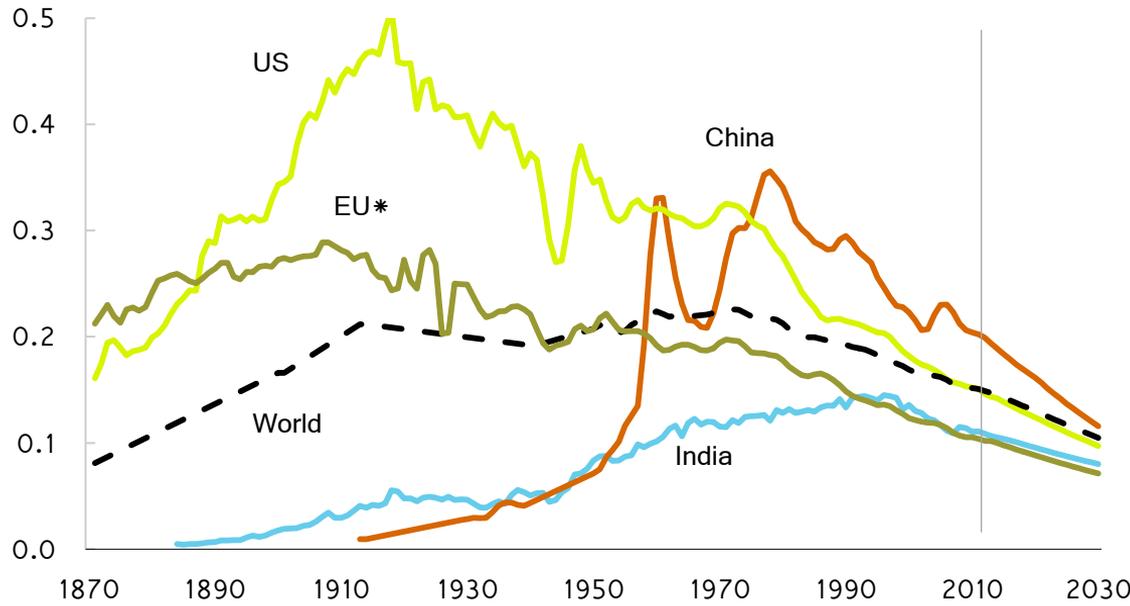
*Euro4 (France, Italy, Germany, UK) pre-1970



Energy efficiency improvements

Energy intensity by region

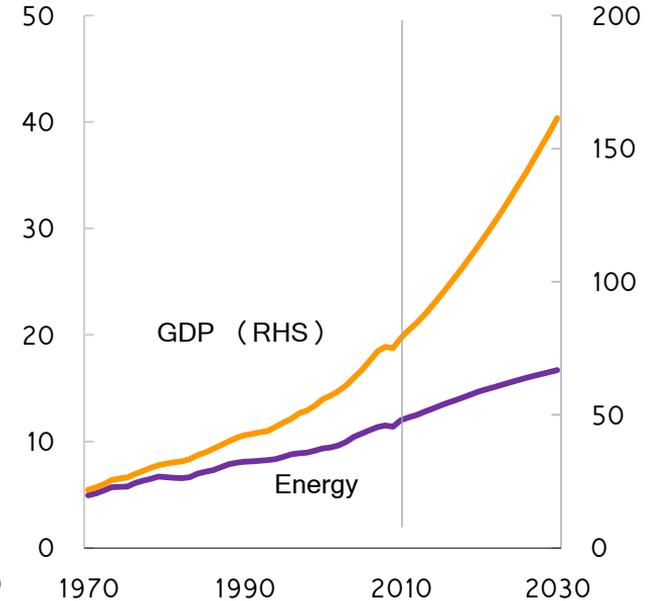
Toe per thousand \$2011 GDP (PPP)



Energy and GDP

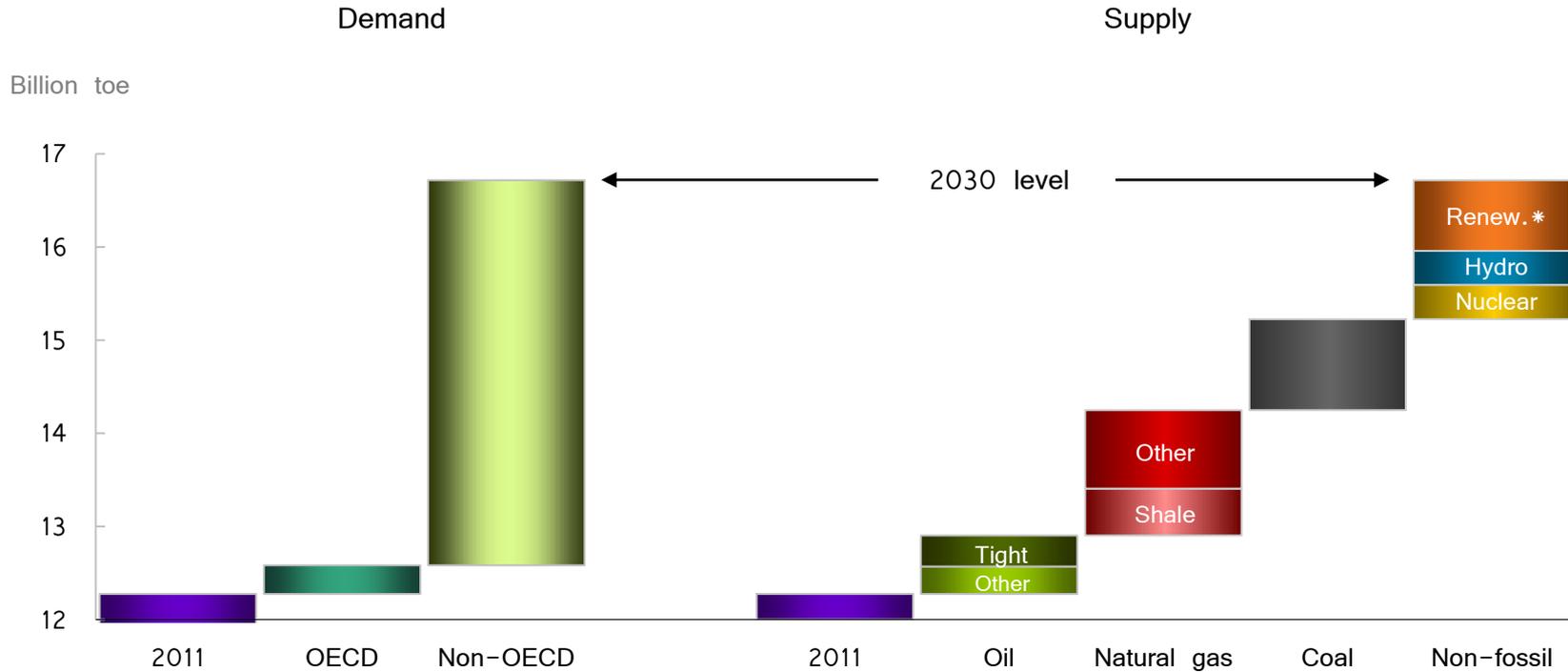
Billion toe

Trillion \$2011 (PPP)



*Euro4 (France, Italy, Germany, UK) pre-1970

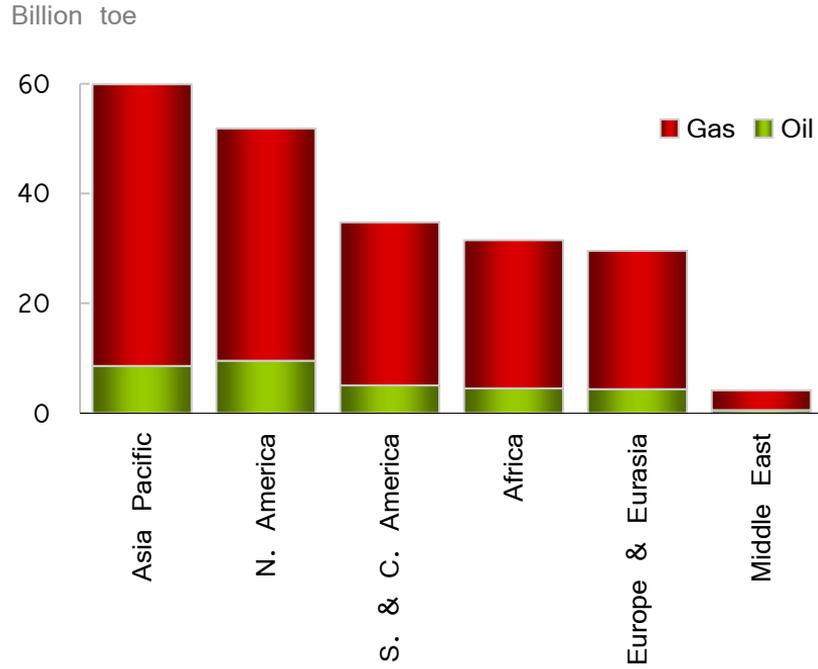
Energy supply growth



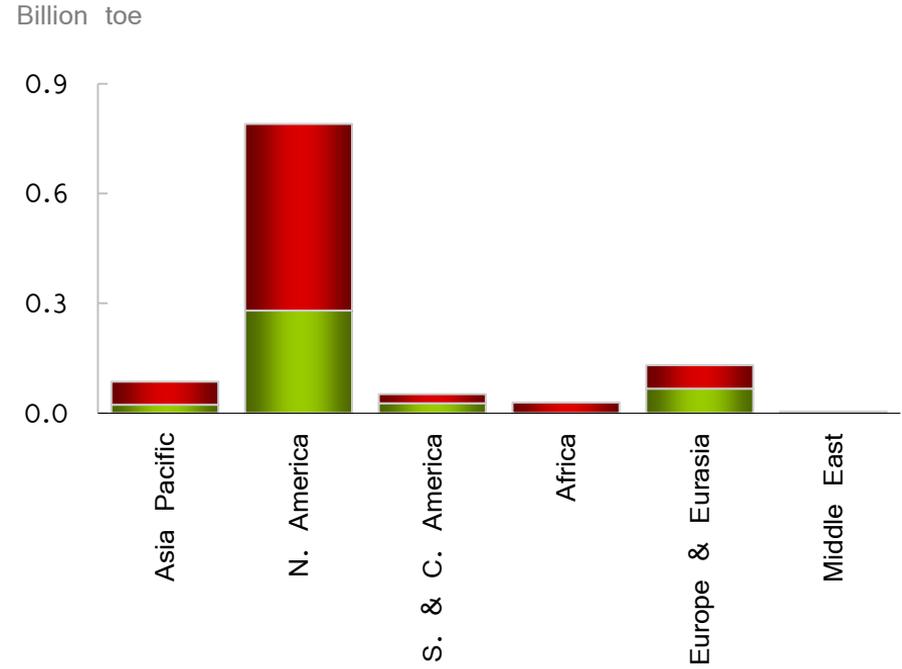
*Includes biofuels

Shale gas and tight oil: resources and production

Current resources



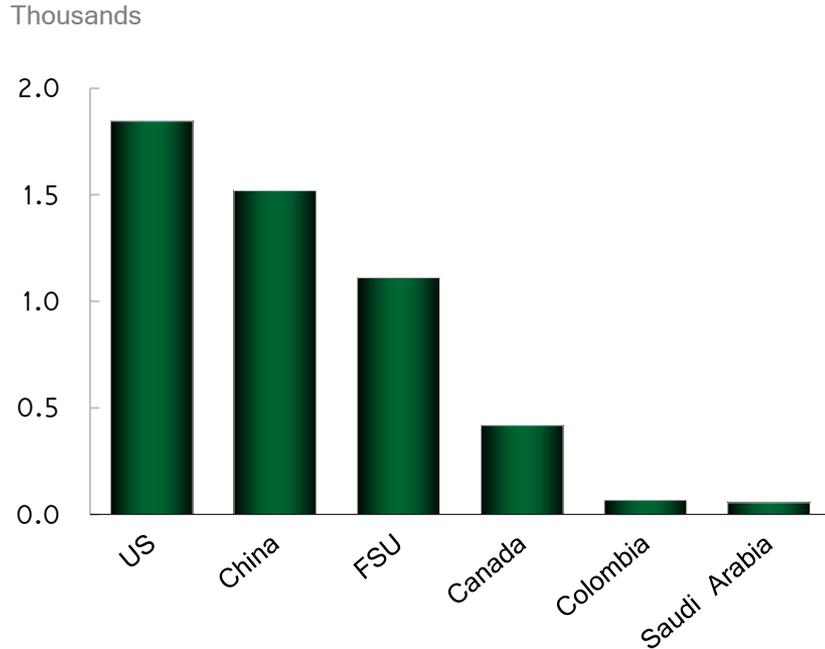
Production in 2030



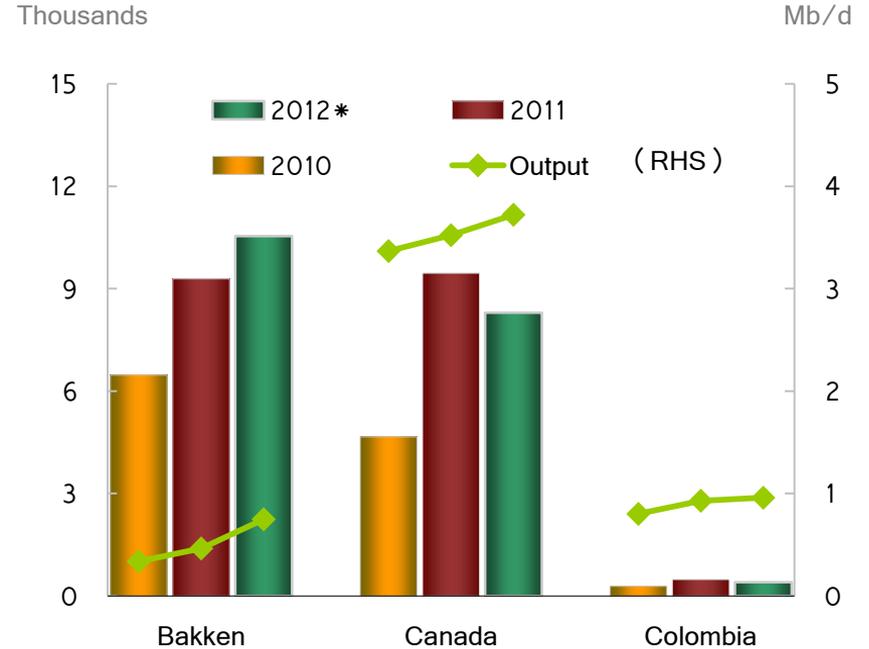
Resources data © OECD/IEA 2012

US tight oil and shale gas: infrastructure requirements

Onshore oil & gas rigs 2011



Oil wells drilled and output



*Annualised from 1Q-3Q data

Introduction

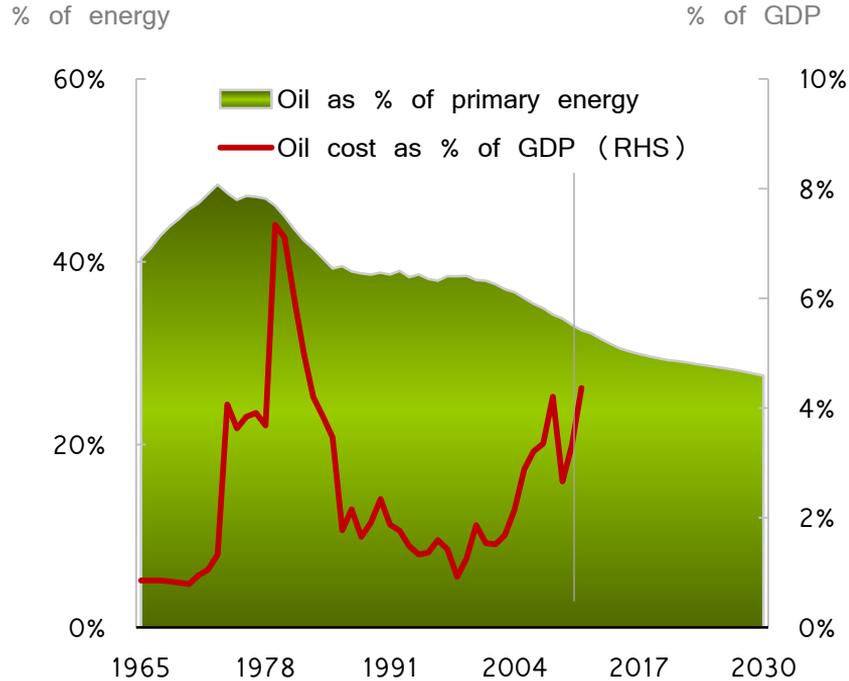
Global energy trends

Outlook 2030: Fuel by fuel

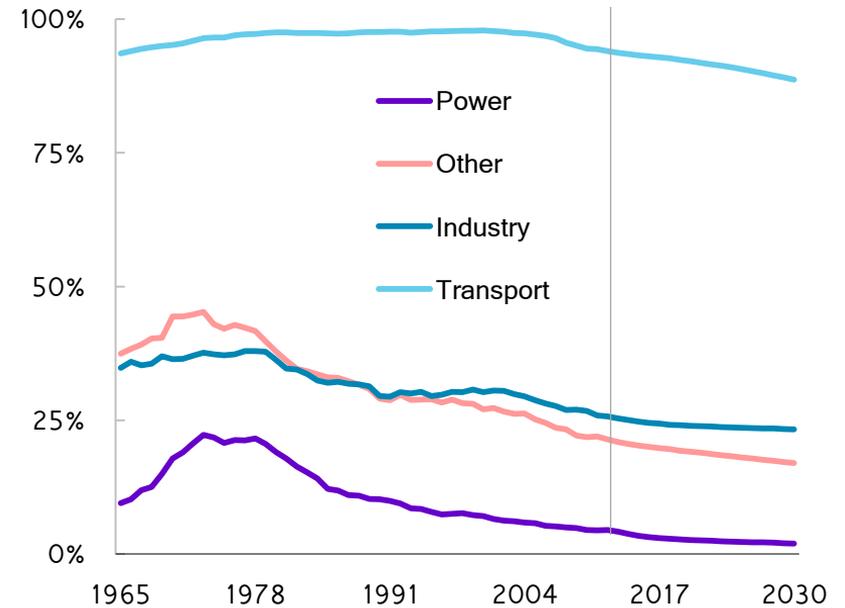
Implications

High oil prices are reducing oil's share of primary energy

Oil share of energy and GDP



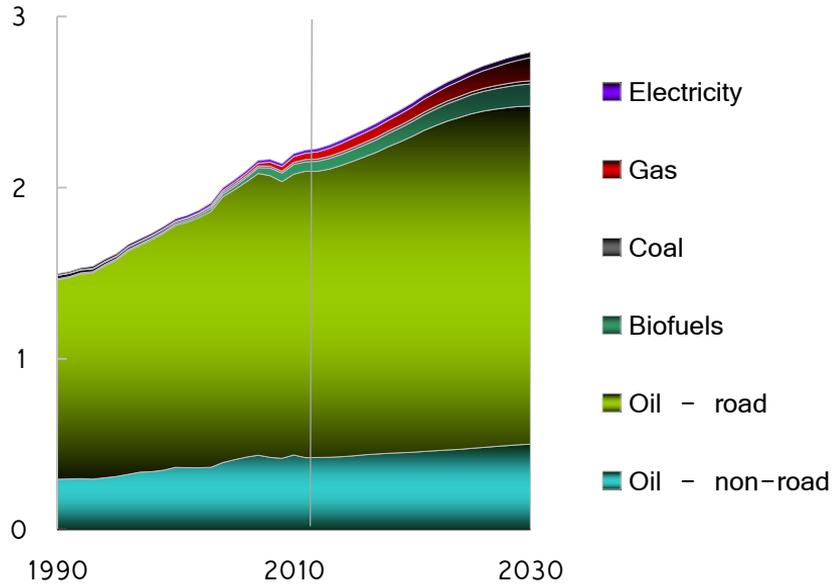
Oil share in sector



Global transport demand

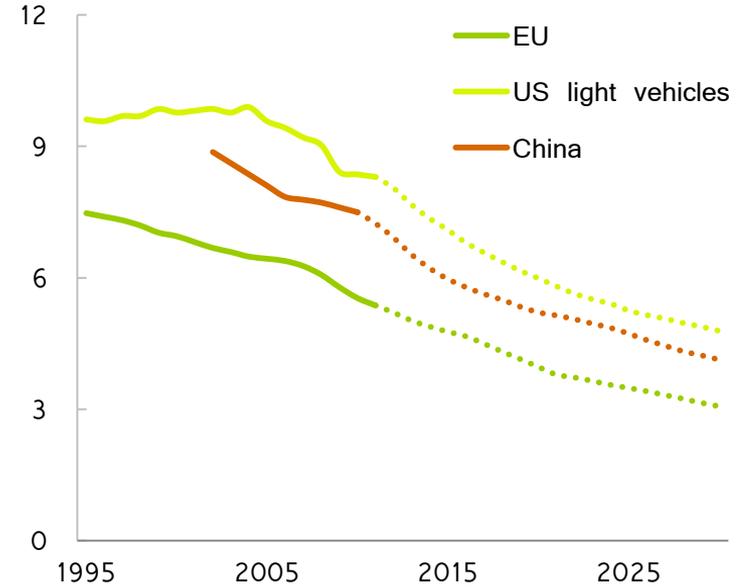
Transport demand by fuel

Billion toe



Fuel economy of new cars

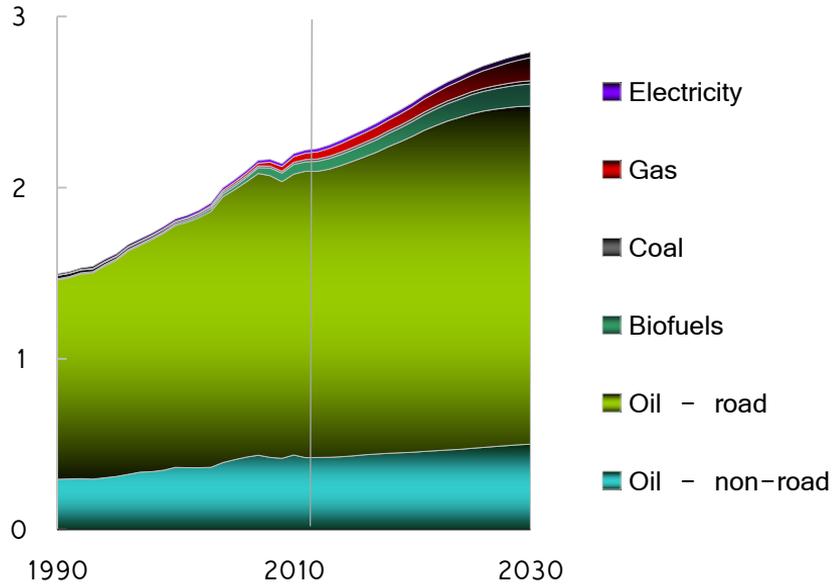
Litres per 100 km



Global transport demand (2)

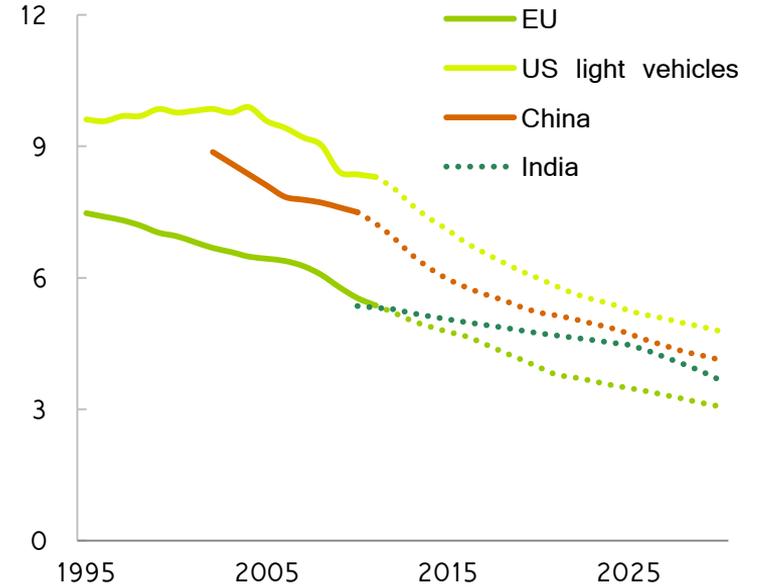
Transport demand by fuel

Billion toe



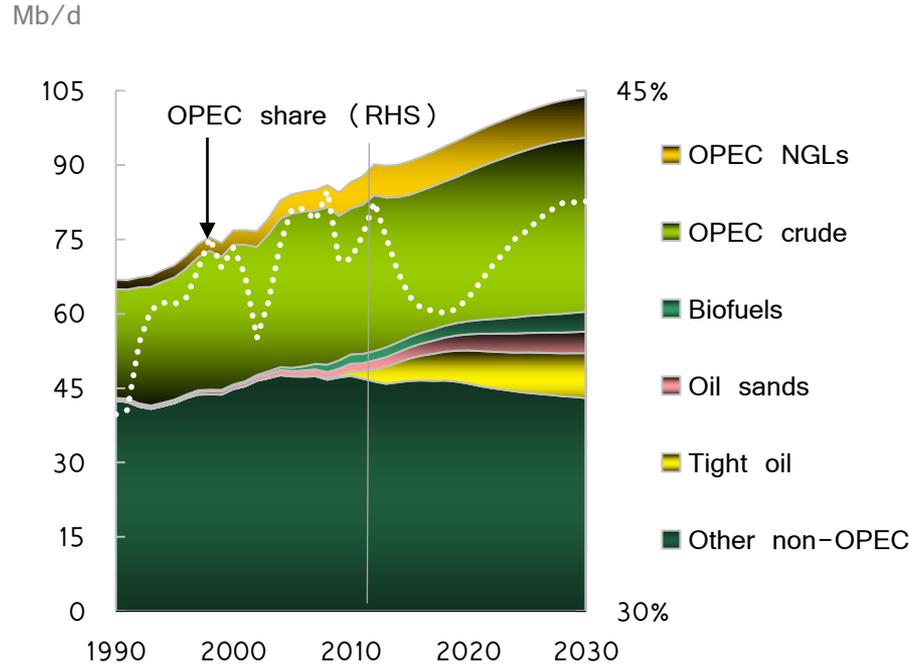
Fuel economy of new cars

Litres per 100 km

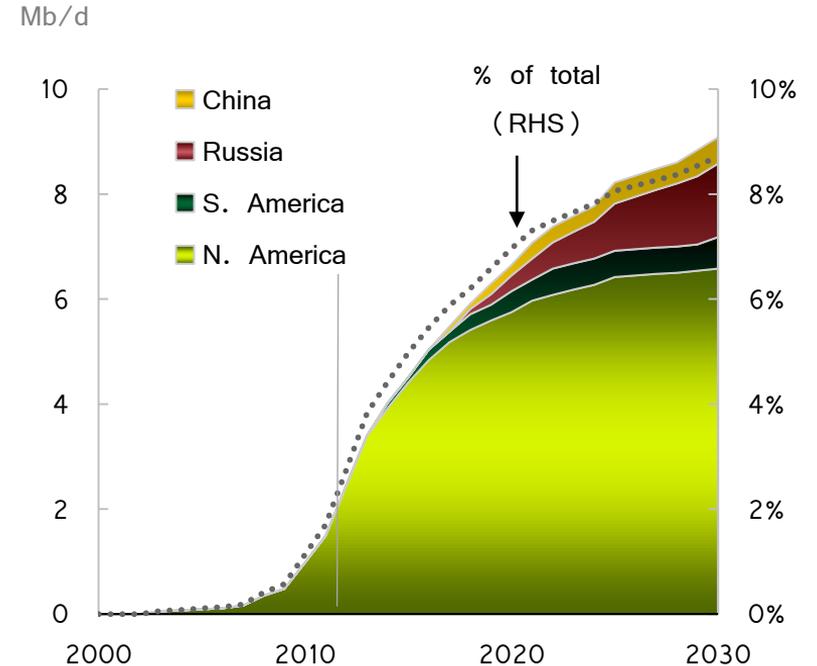


Global supply growth and tight oil

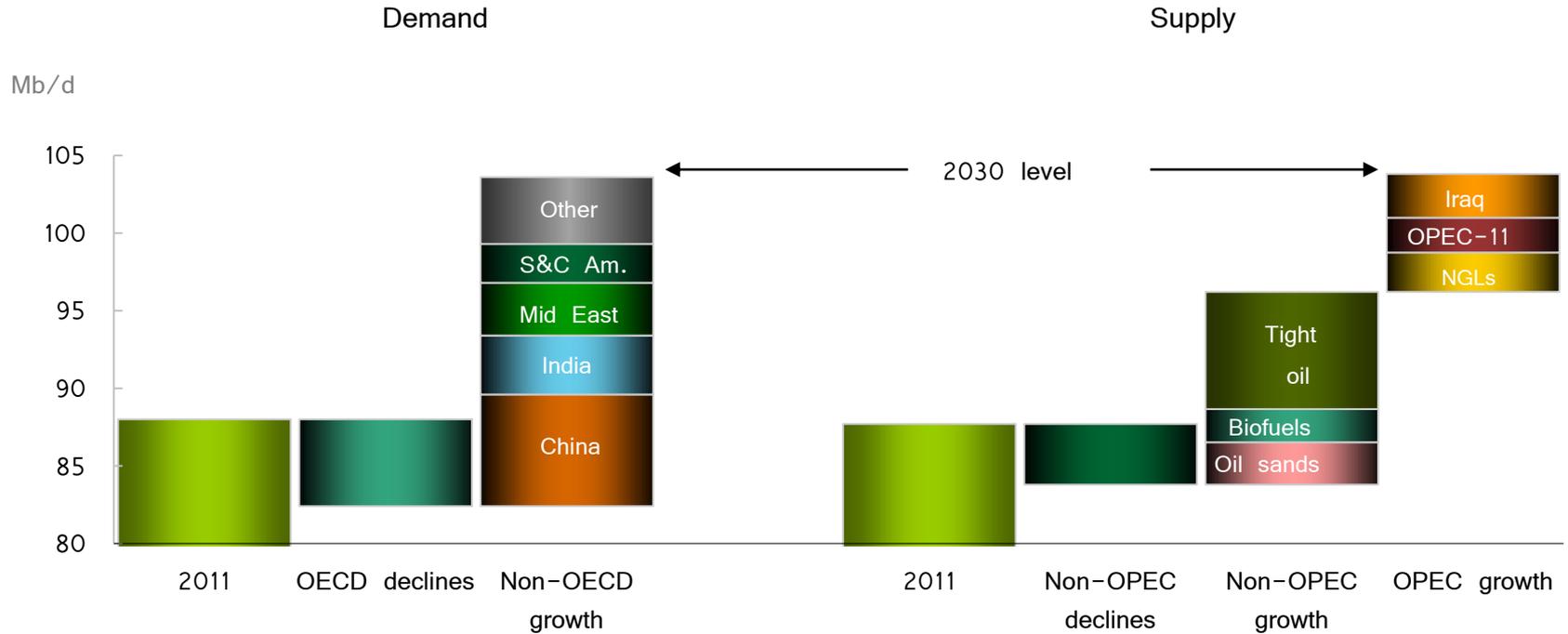
Liquids supply by type



Tight oil output

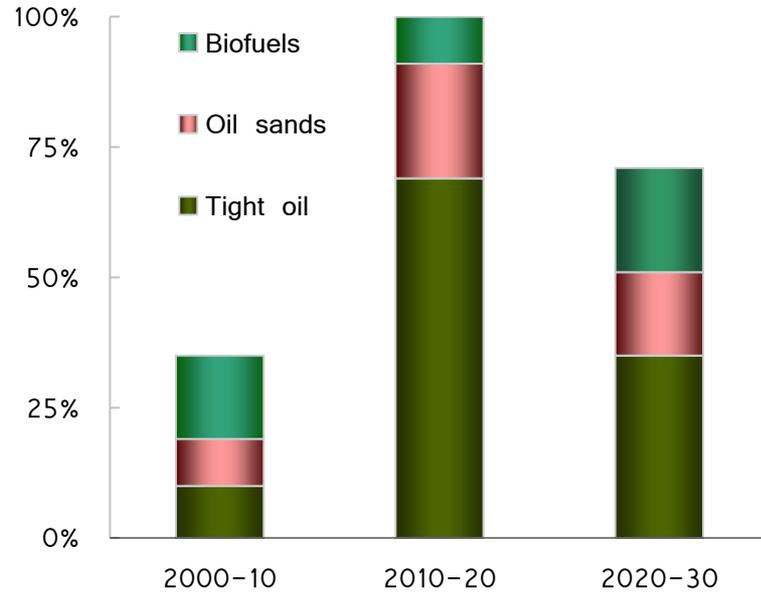


Global liquids balance

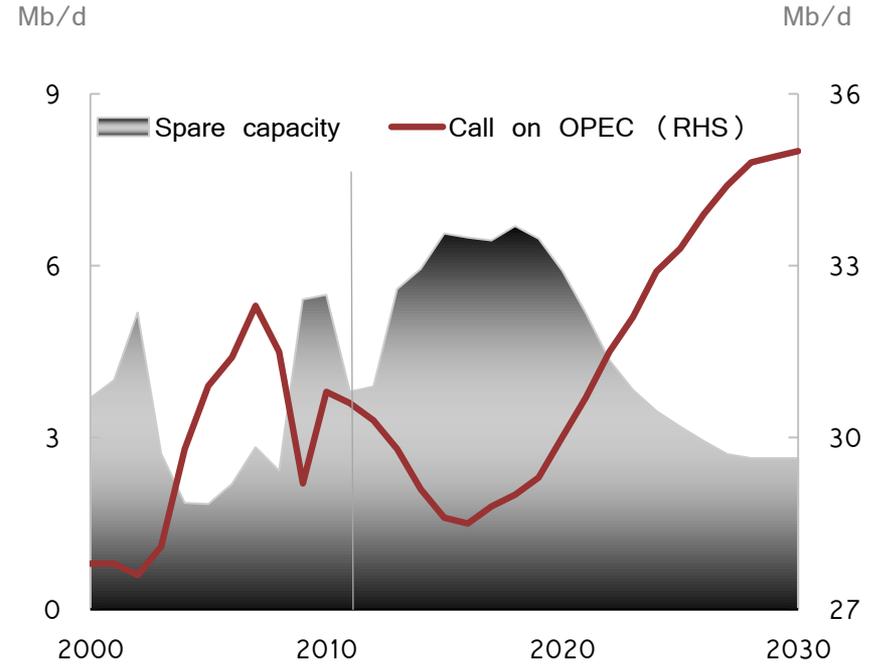


Unconventional oil and the call on OPEC

Unconventionals share of net global supply growth

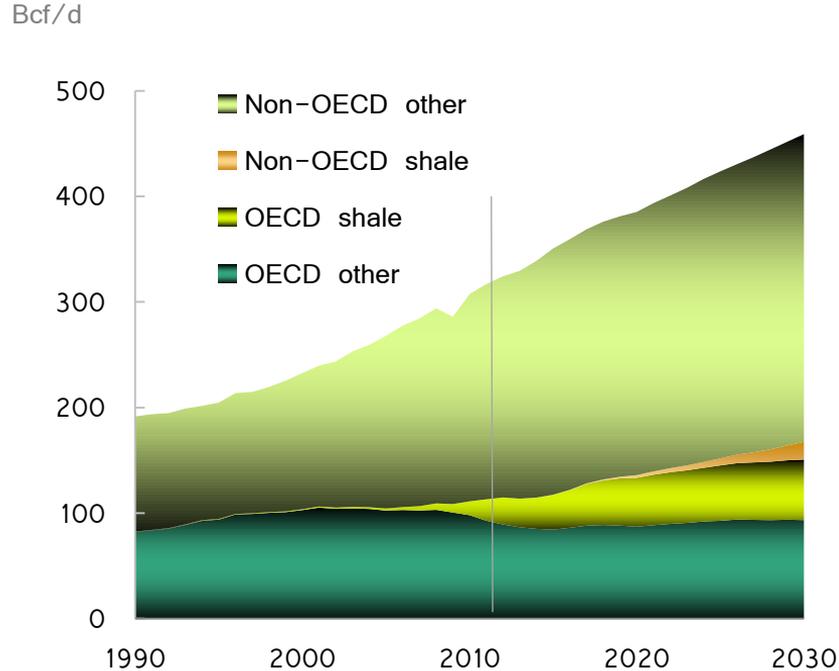


Call on OPEC & spare capacity

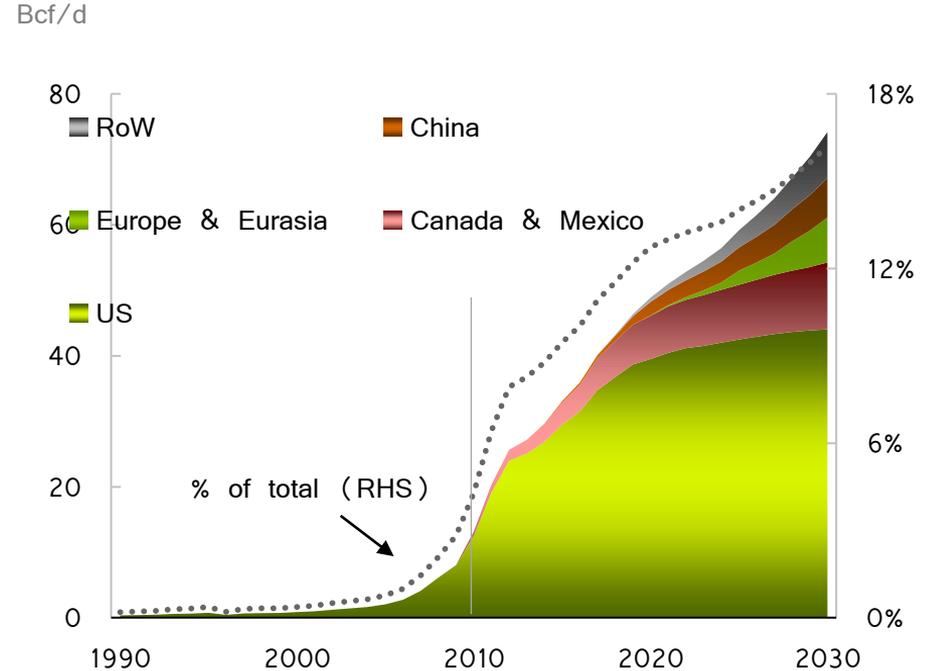


Shale gas and global supply growth

Gas production by type and region

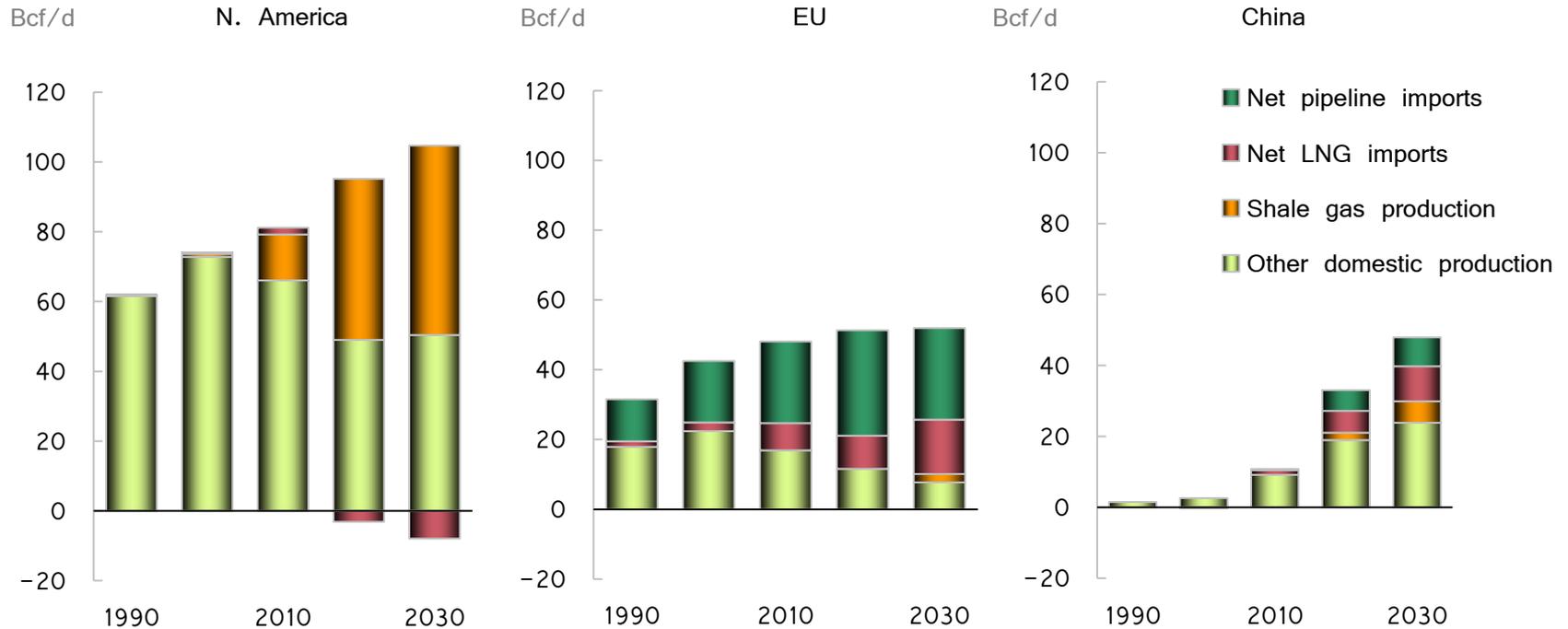


Shale gas production



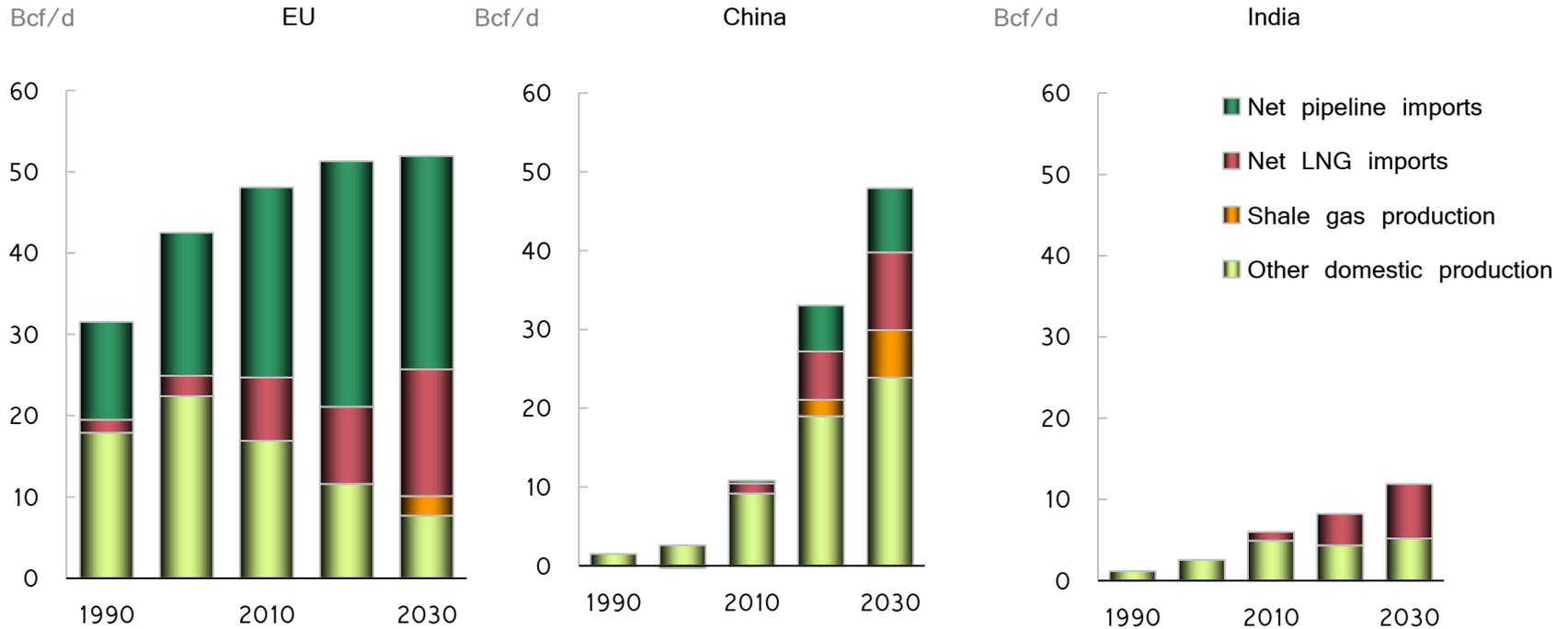
Shale gas: regional growth

Sources of gas supply, by region



Shale gas: regional growth (2)

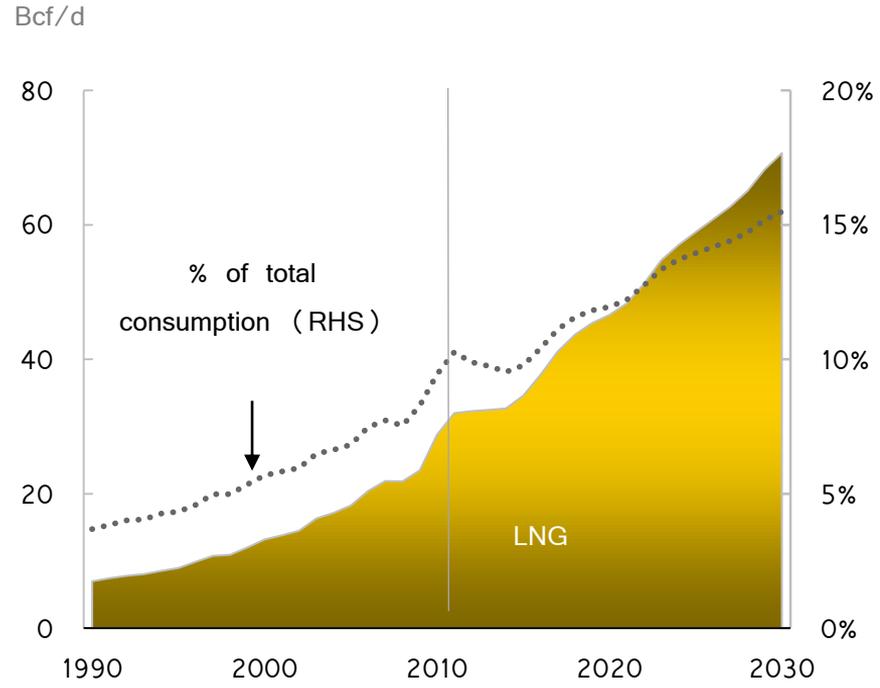
Sources of gas supply, by region



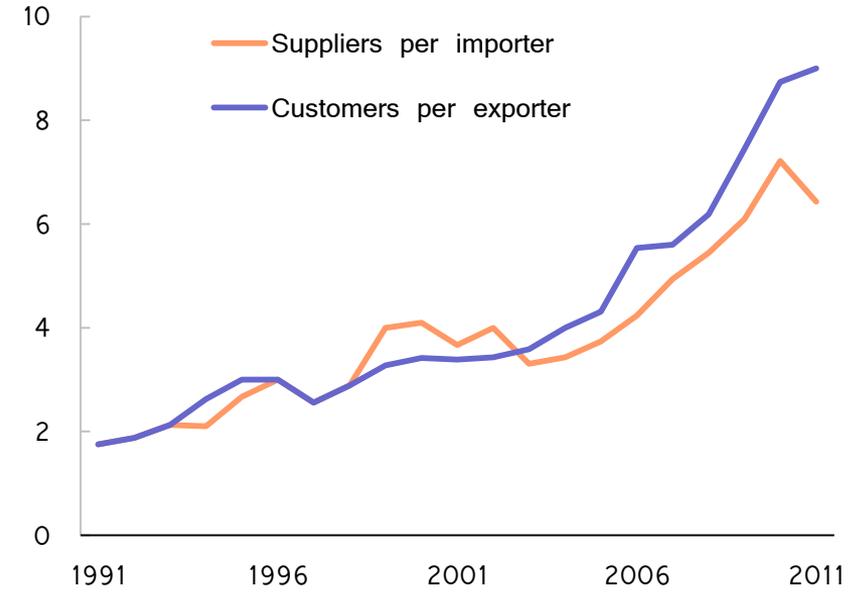


Gas trade and market integration

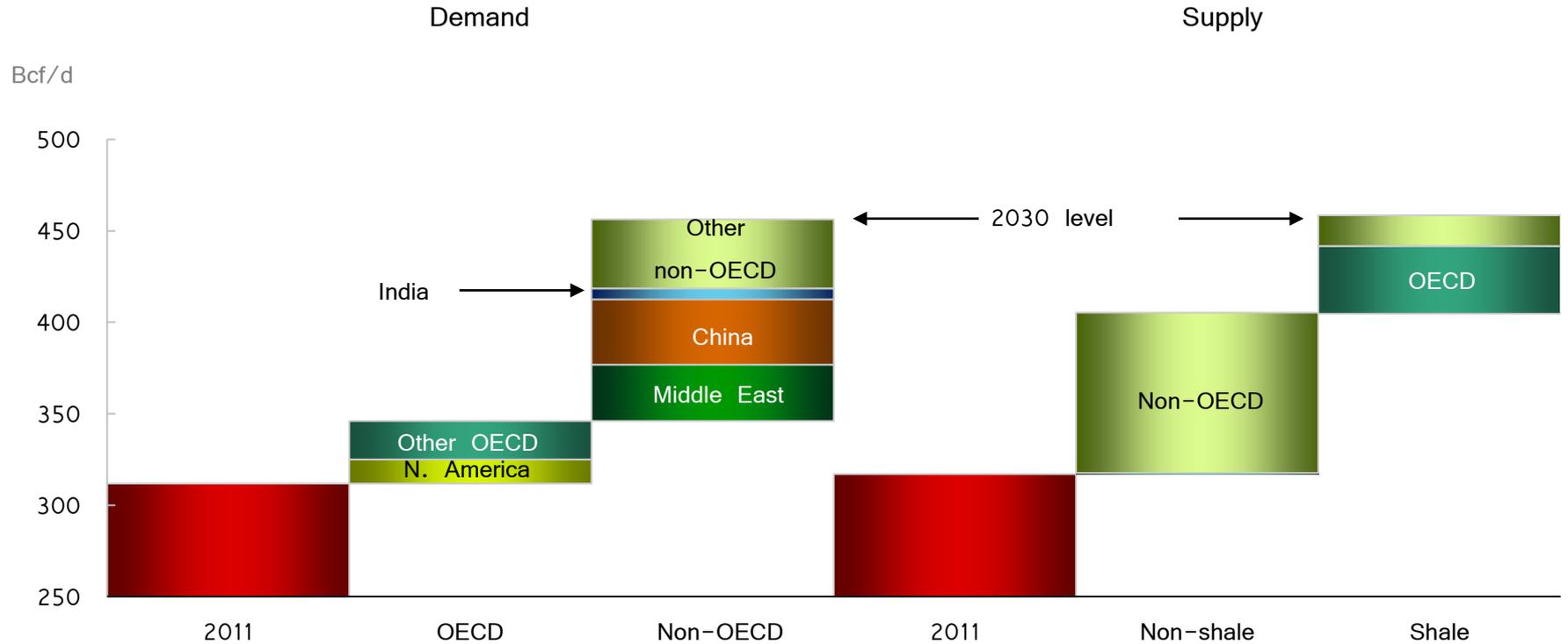
LNG exports



LNG diversification



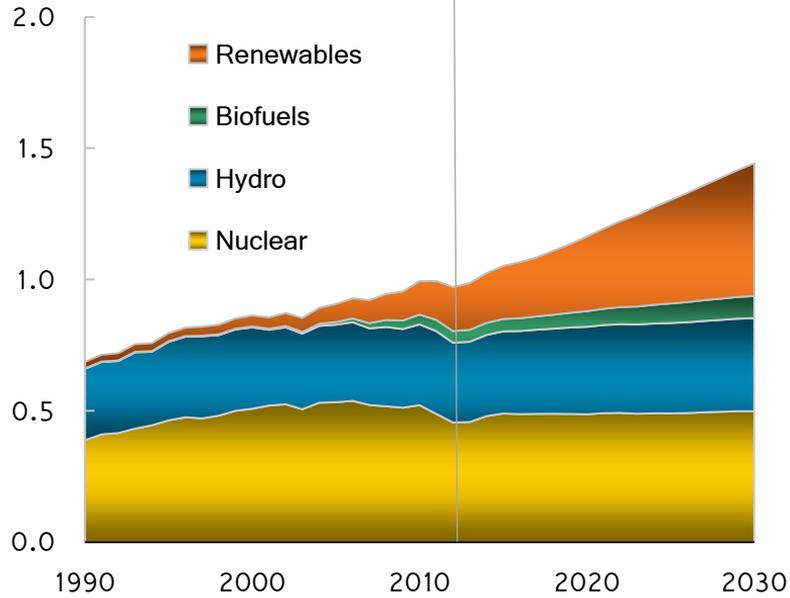
Global gas balance



Non-fossil fuels

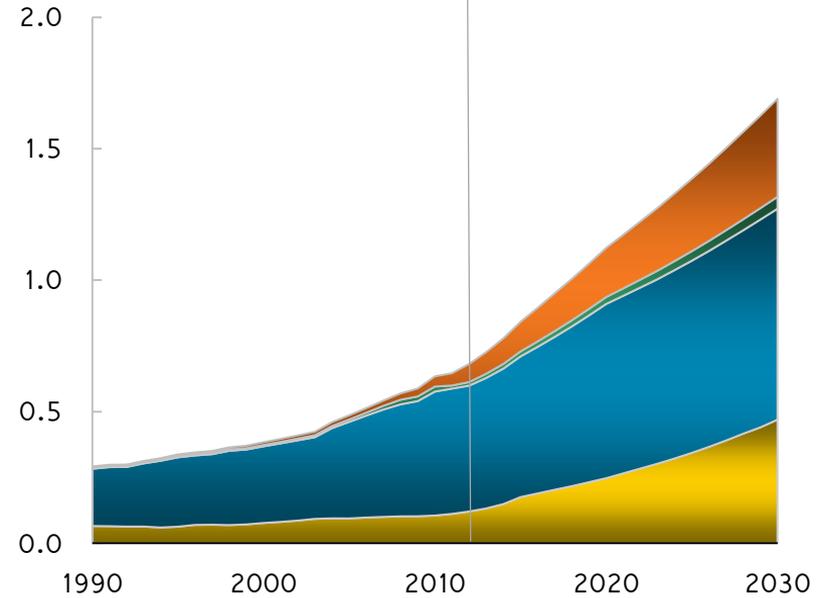
OECD

Billion toe



Non-OECD

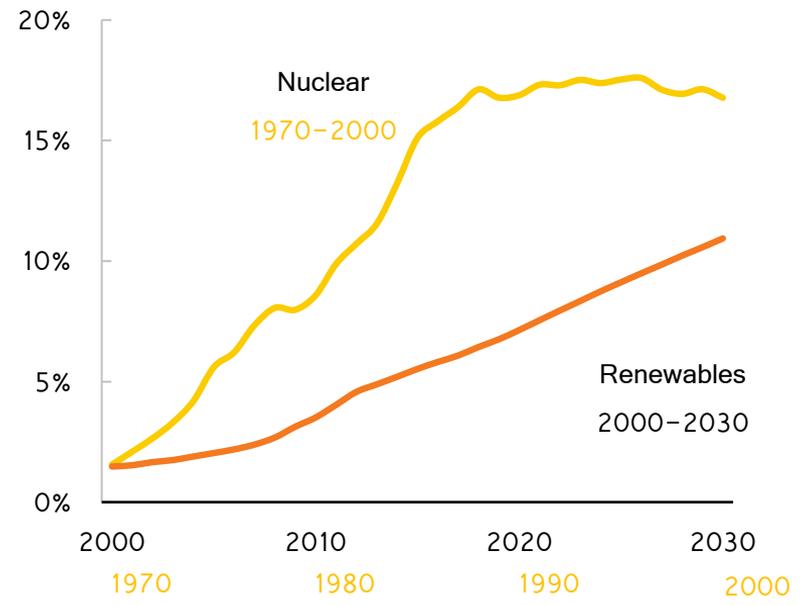
Billion toe





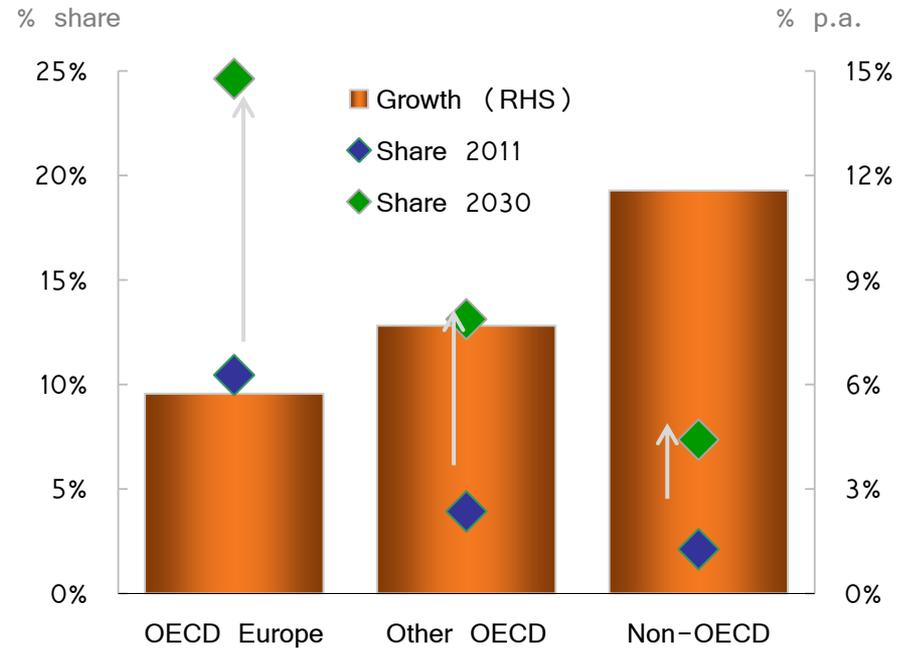
Growth of renewables in power

Share of power generation



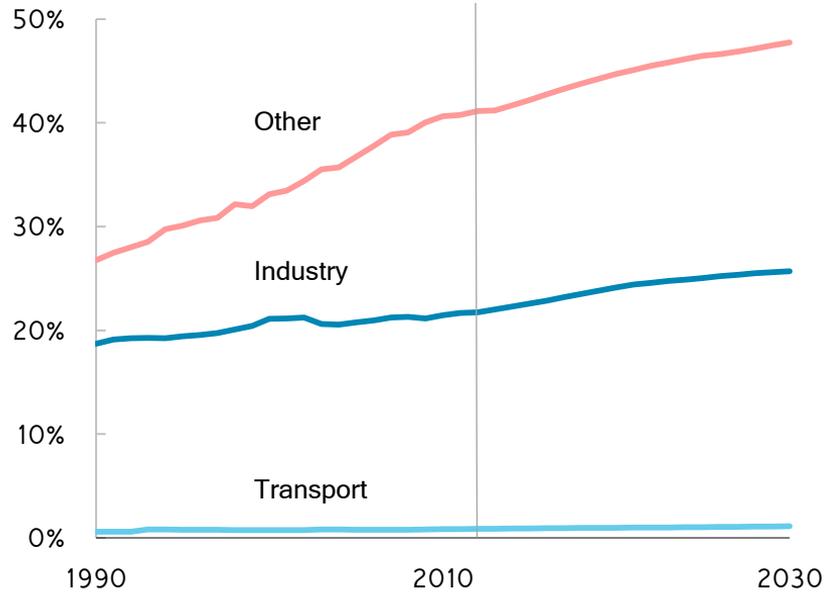
Renewable power

Growth 2011-30, and share of power

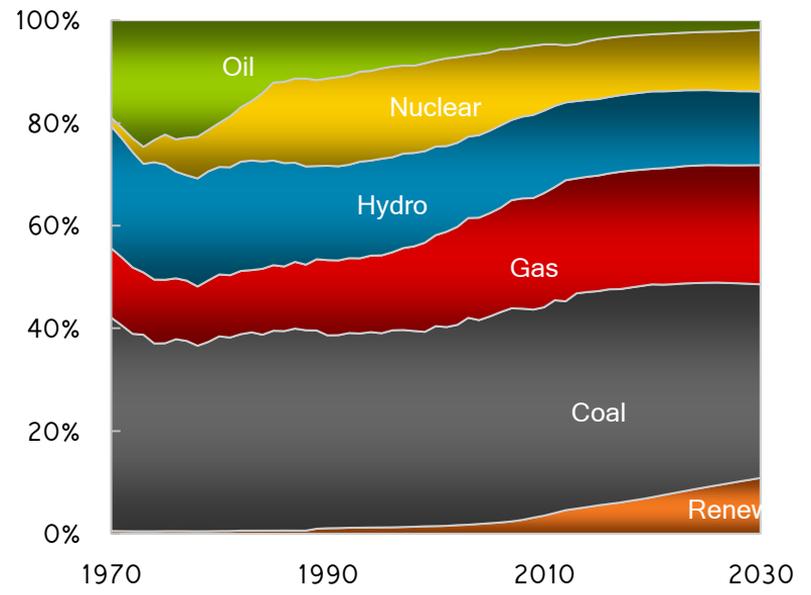


Power generation and electricity use

Electricity share of final consumption



Shares of power output





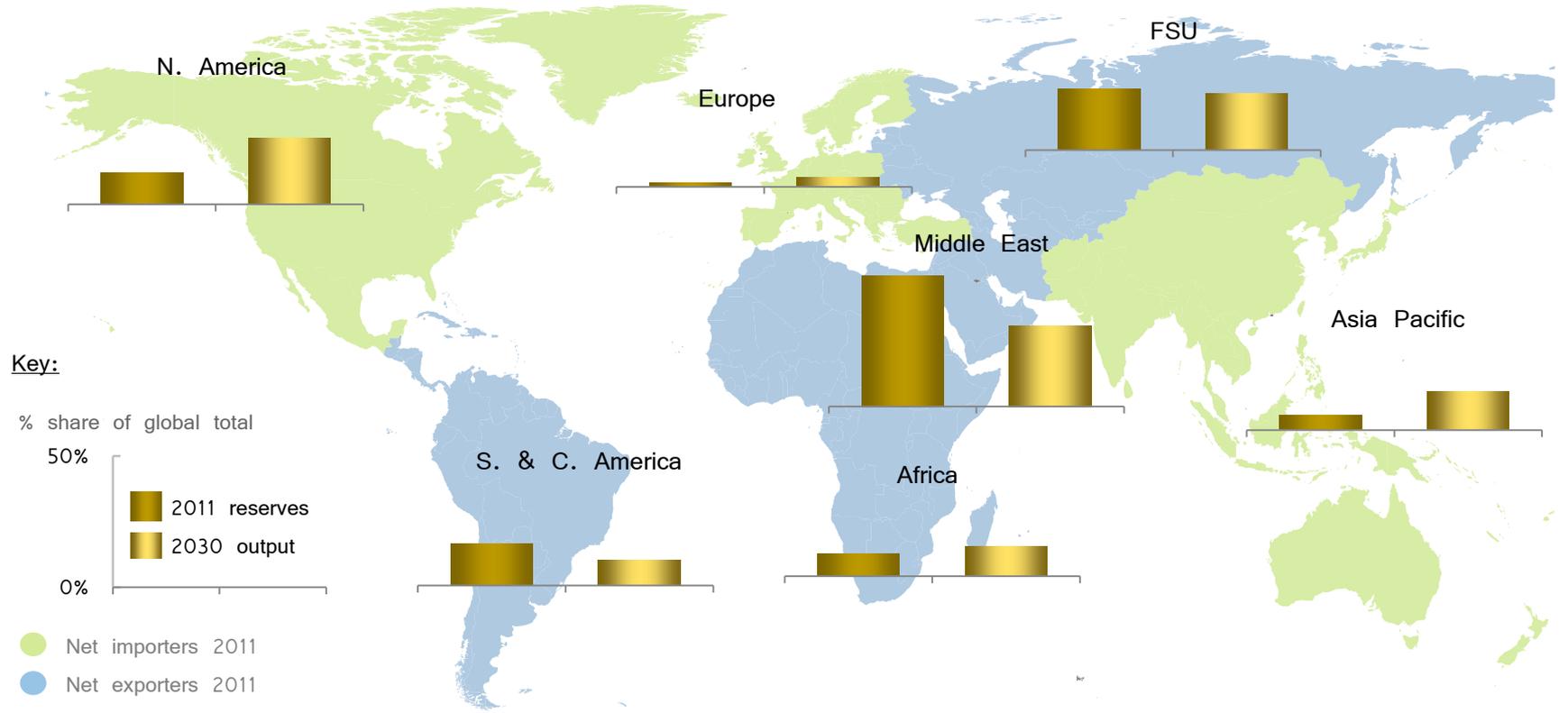
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Outlook 2030: Fuel by fuel

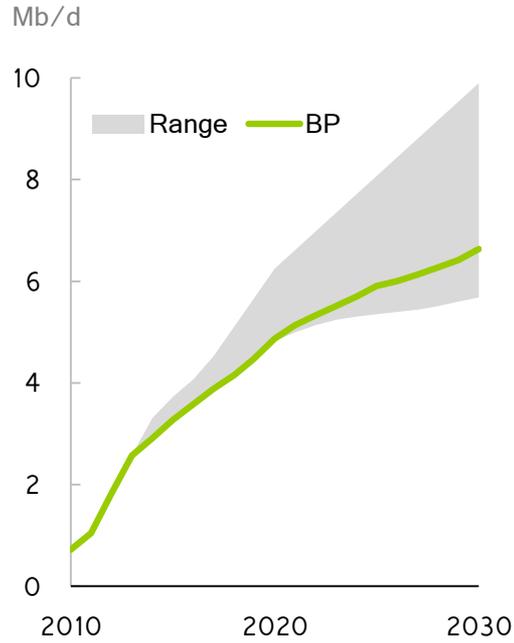
Implications

Oil and gas: reserves and production

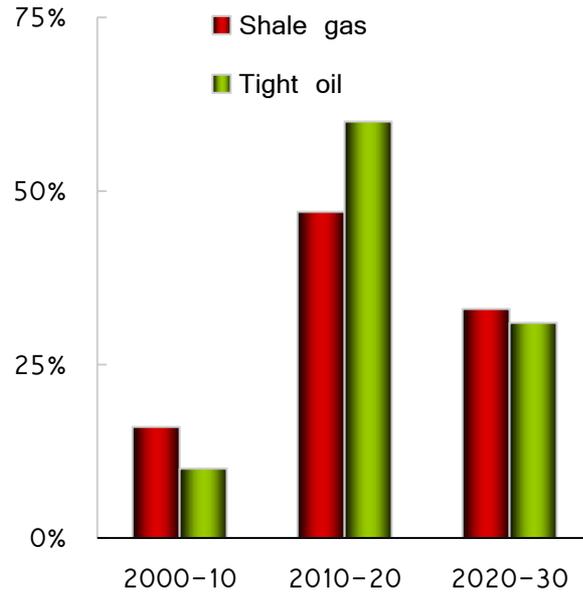


Tight oil and shale gas uncertainties

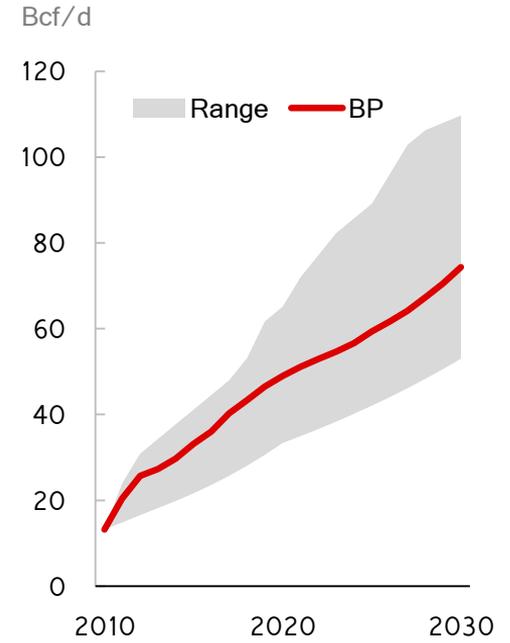
Range of tight oil forecasts (excludes NGLs)



Share of global supply growth

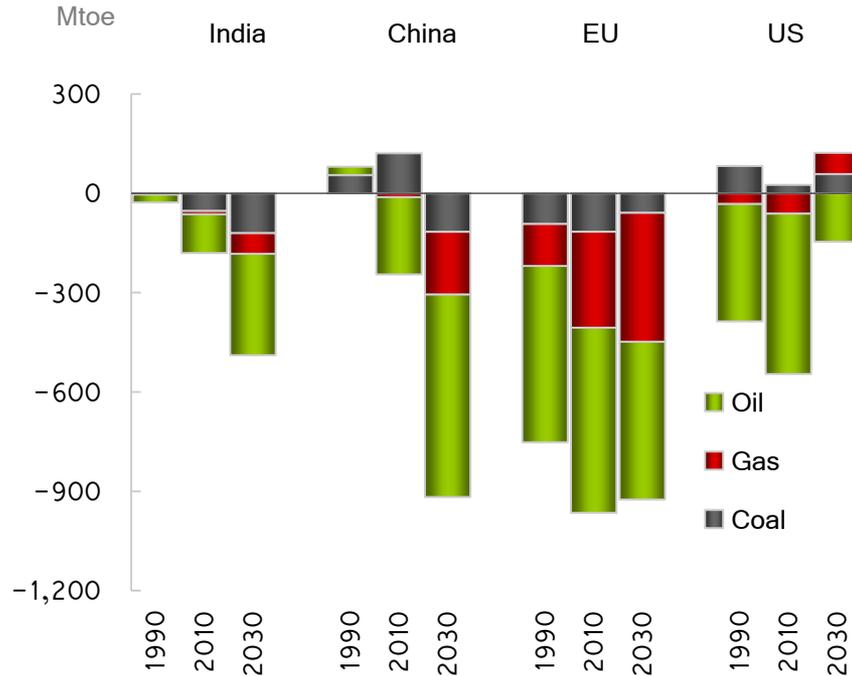


Range of shale gas forecasts

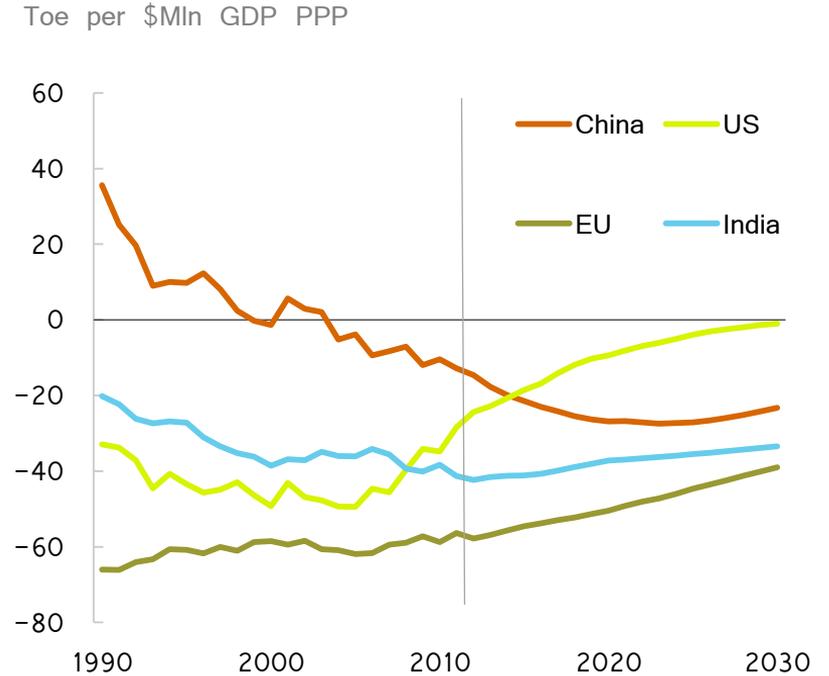


Energy imbalances: import profiles

Energy imbalances

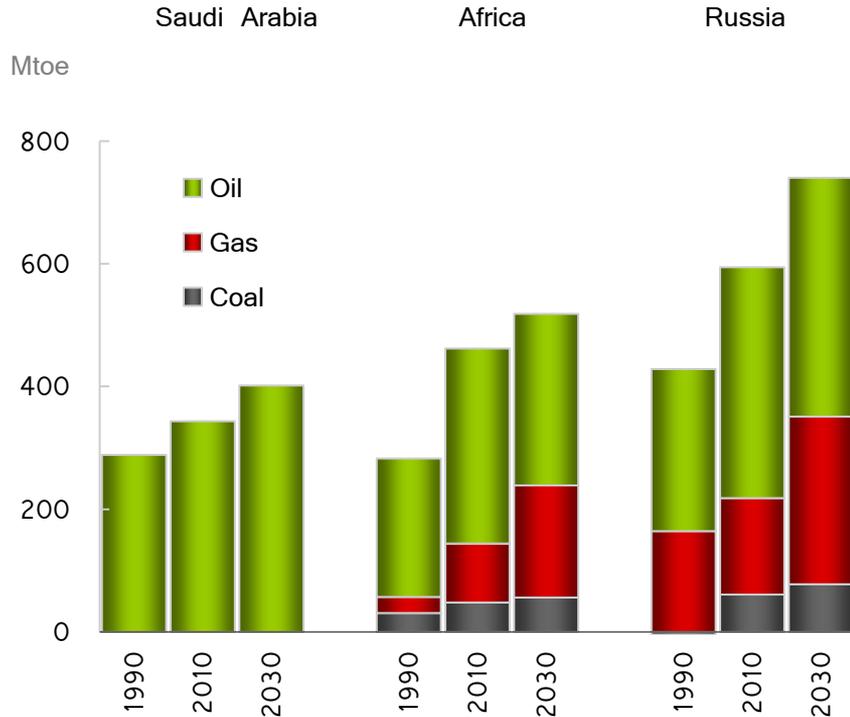


Energy imbalances to GDP ratio

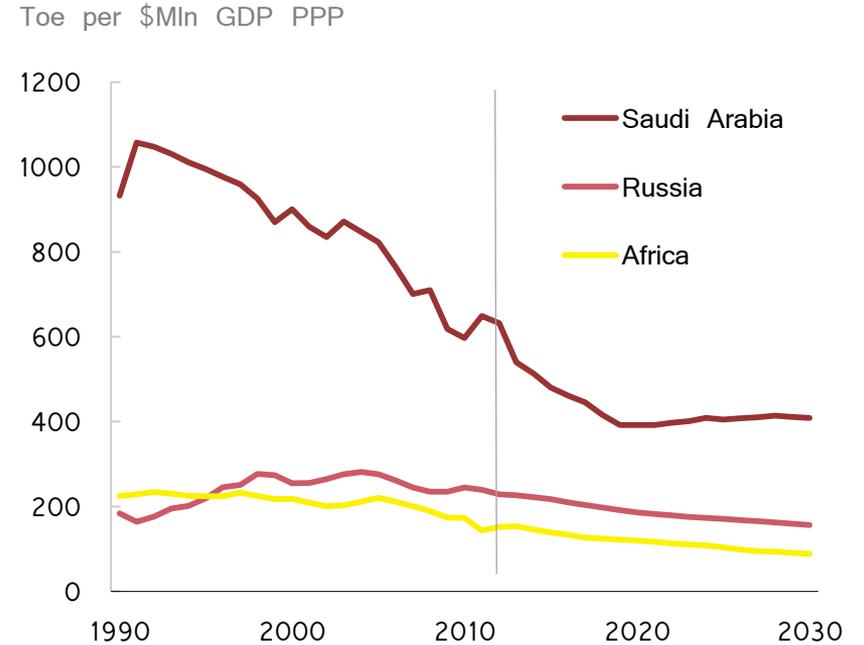


Energy imbalances: export profiles

Energy imbalances

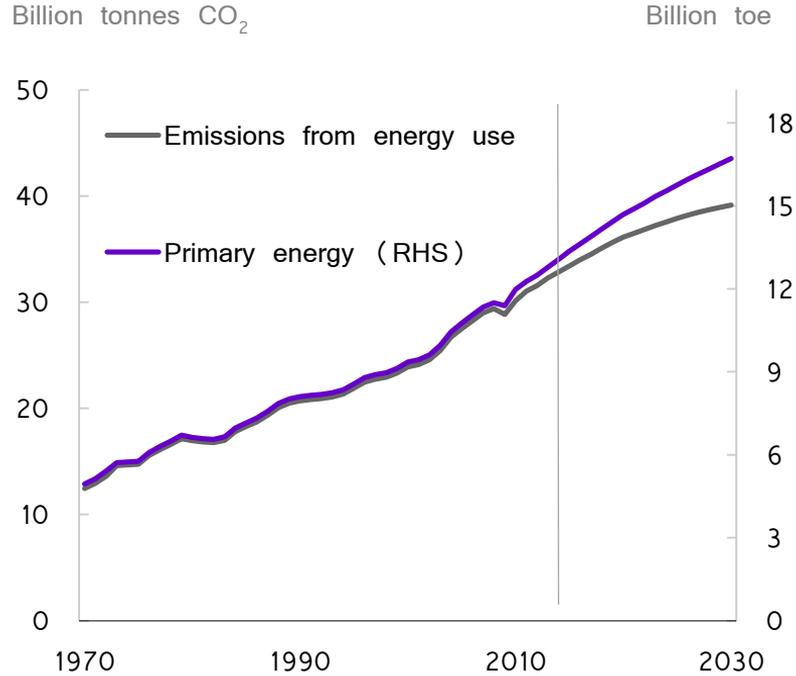


Energy imbalances to GDP ratio

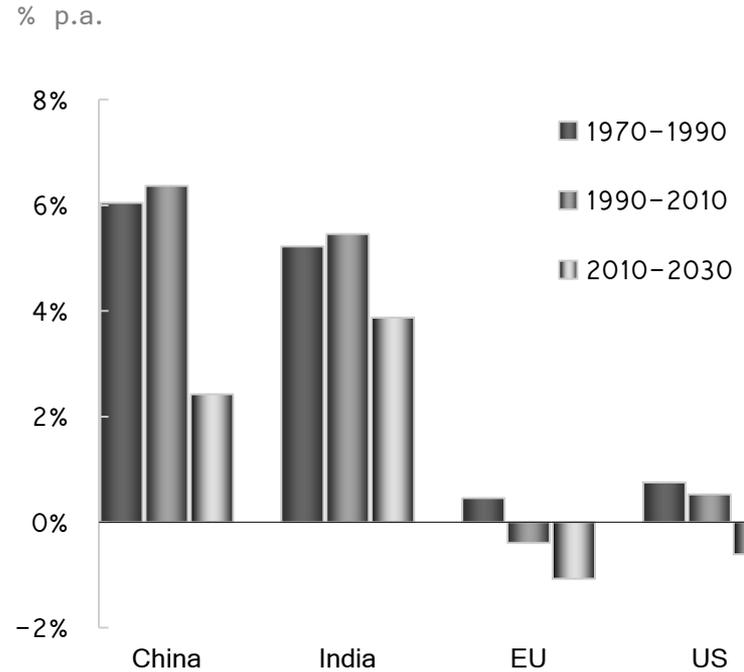


Energy and carbon emissions

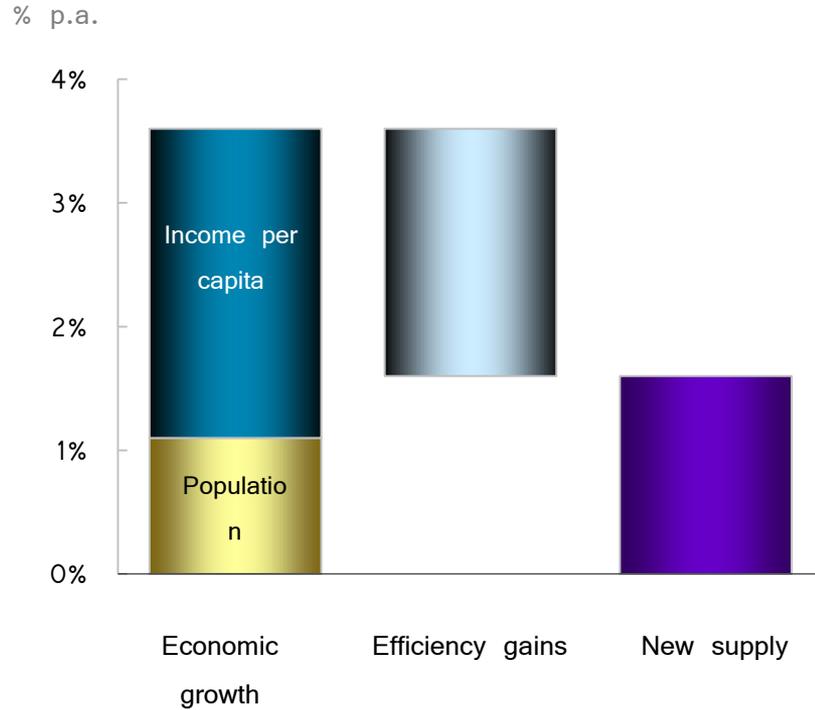
CO₂ emissions and primary energy



Growth of CO₂ emissions



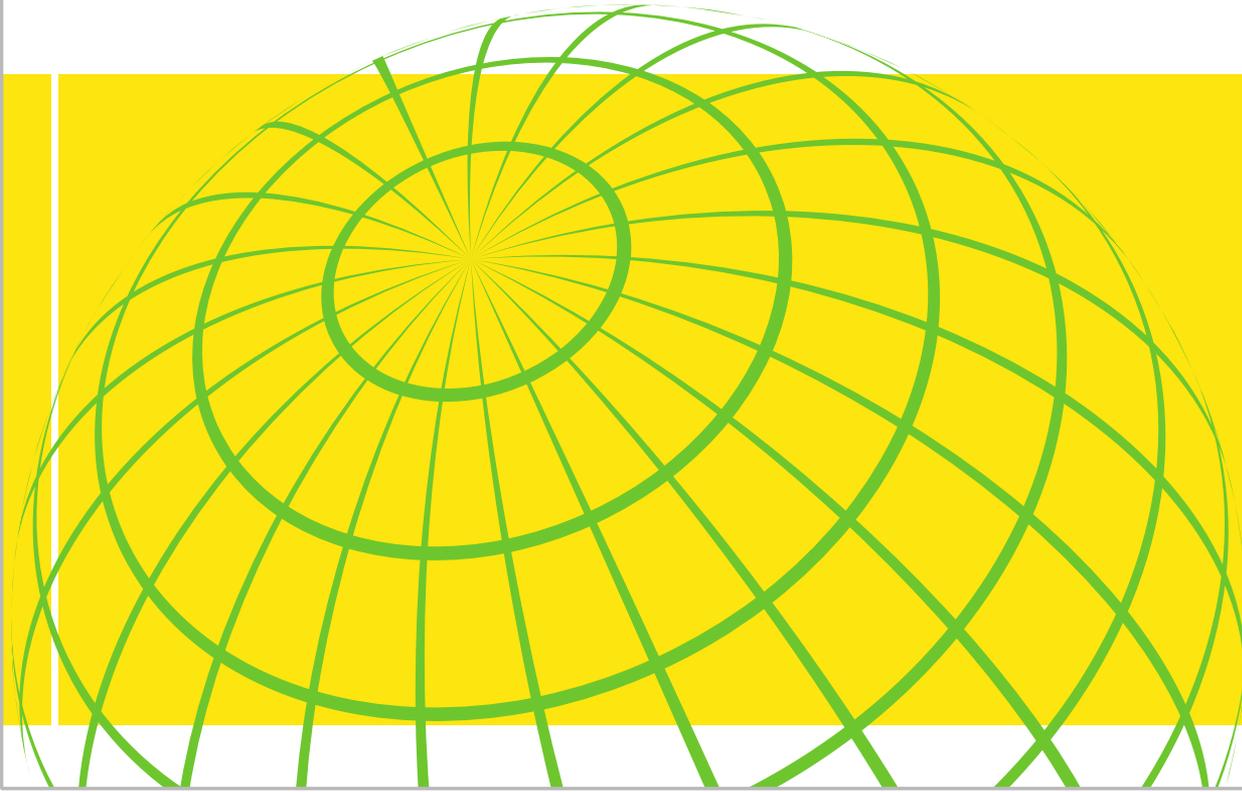
Conclusion



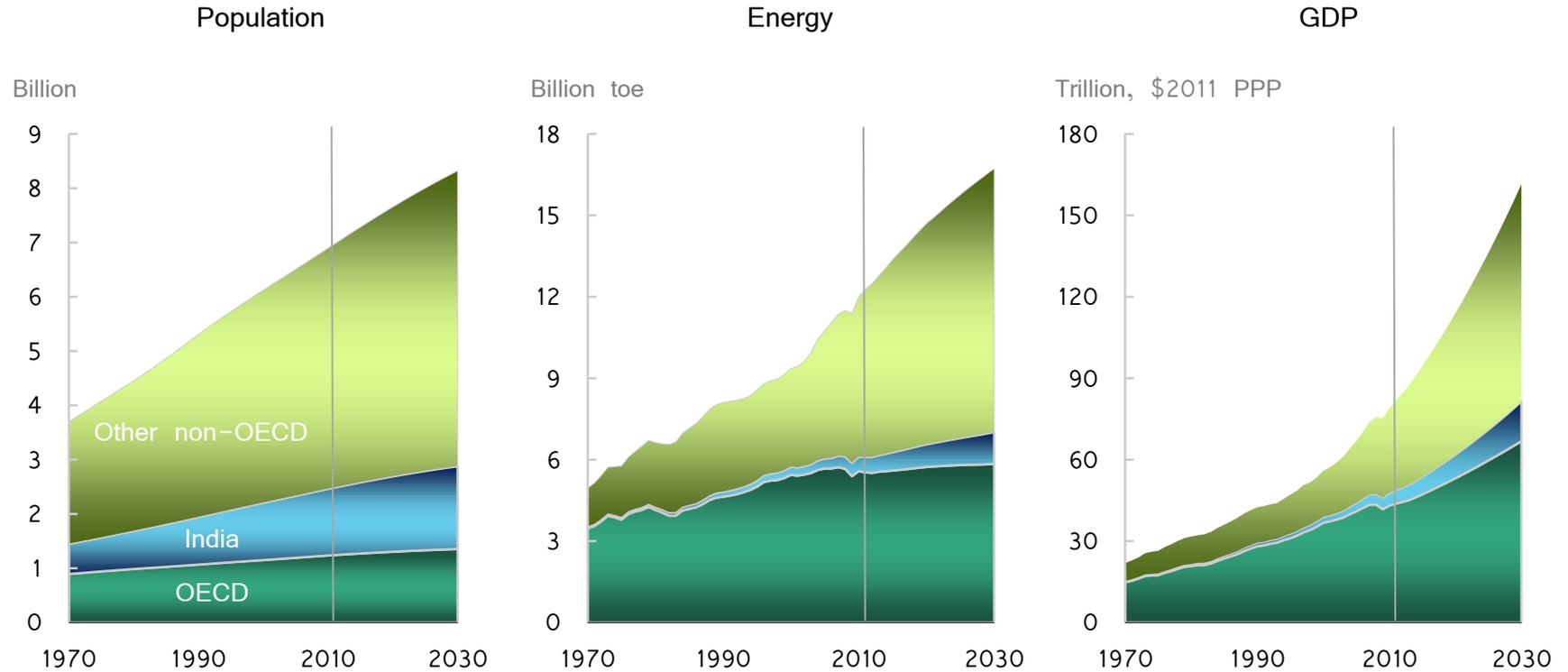
- Economic growth needs energy
- Competition and innovation are the key to meeting this need
 - energy efficiency
 - new supplies
- Energy security and climate change remain challenges

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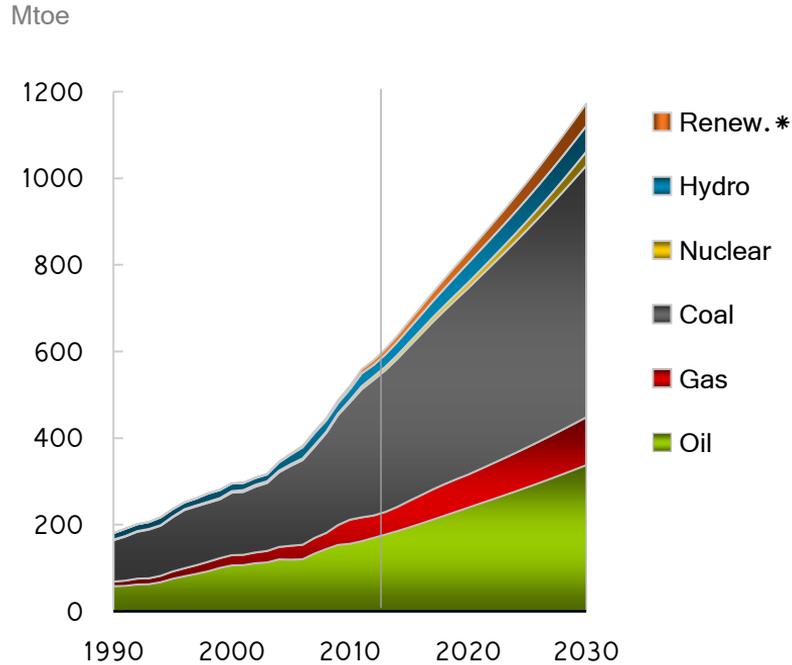
BP Energy Outlook 2030



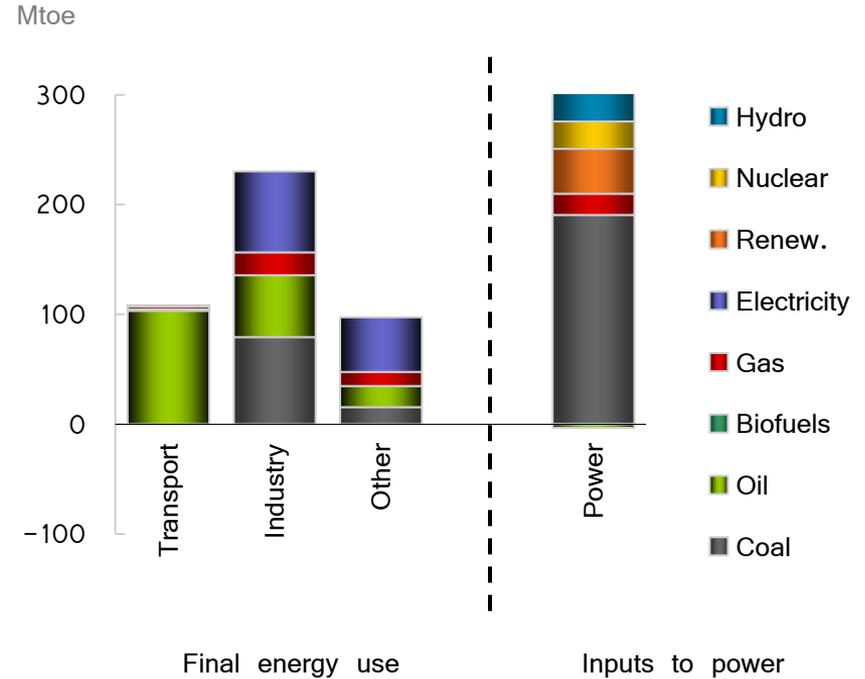
Alternative for #4



Primary energy demand by fuel



Growth by sector and fuel, 2011-2030

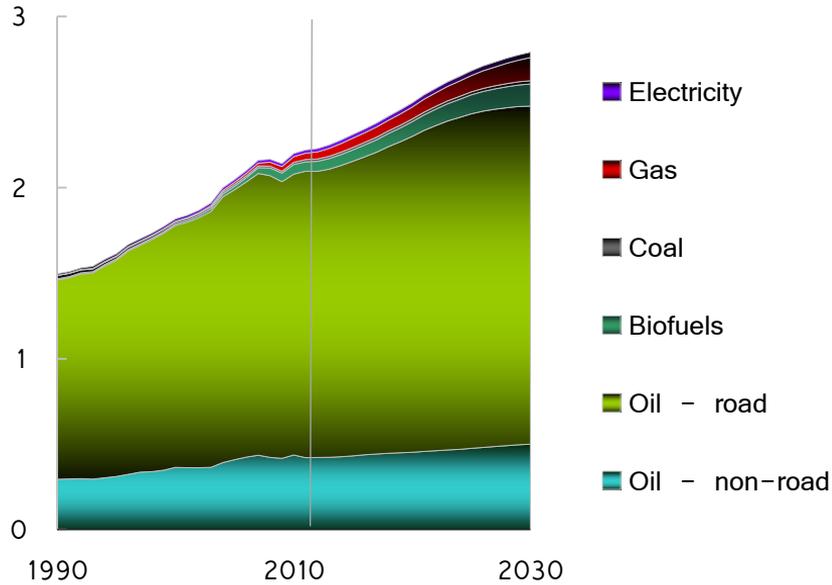


*Includes biofuels

Global transport demand (with India forecast added, no history)

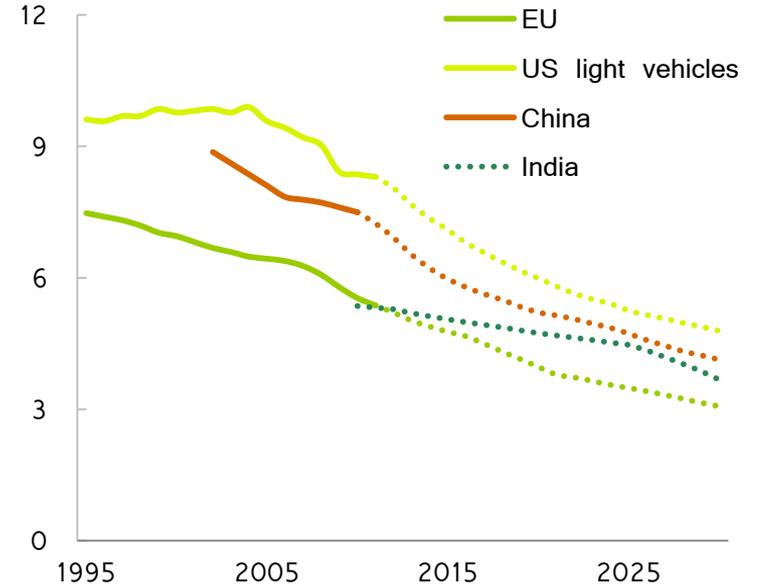
Transport demand by fuel

Billion toe



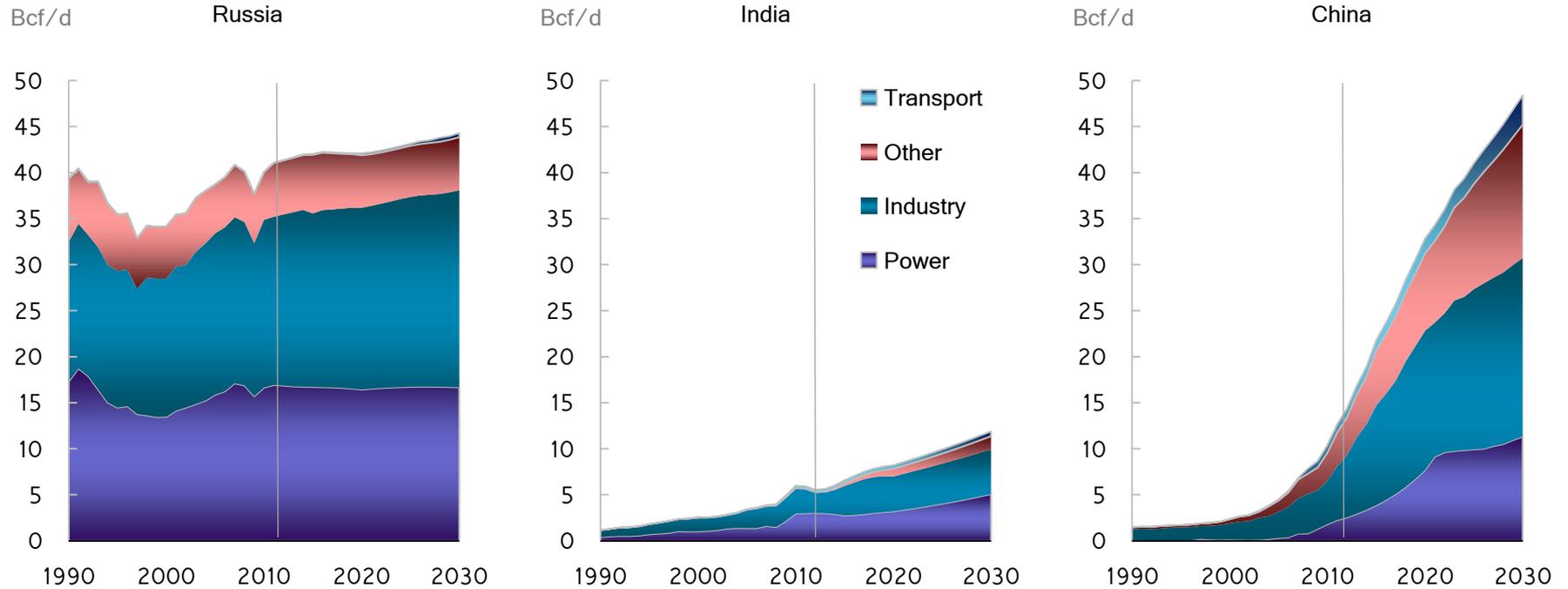
Fuel economy of new cars

Litres per 100 km



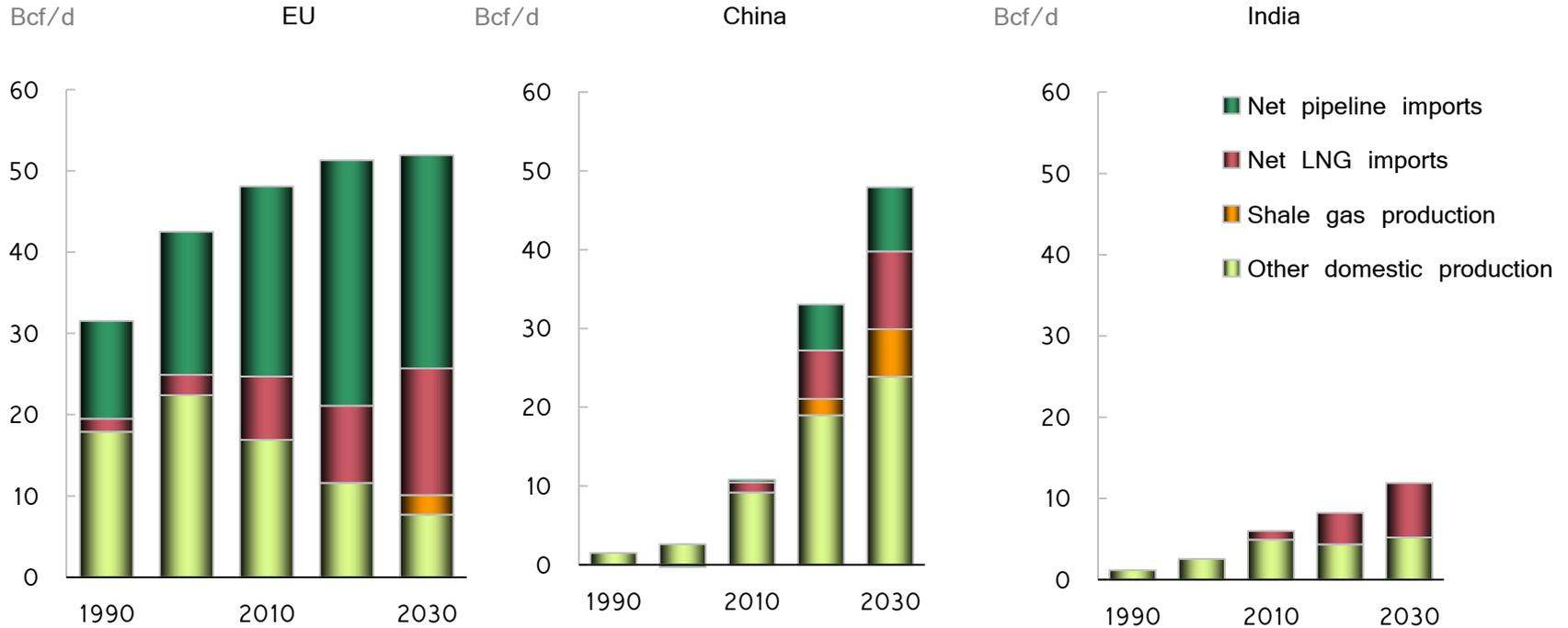
Alternative or additional

Gas demand by sector



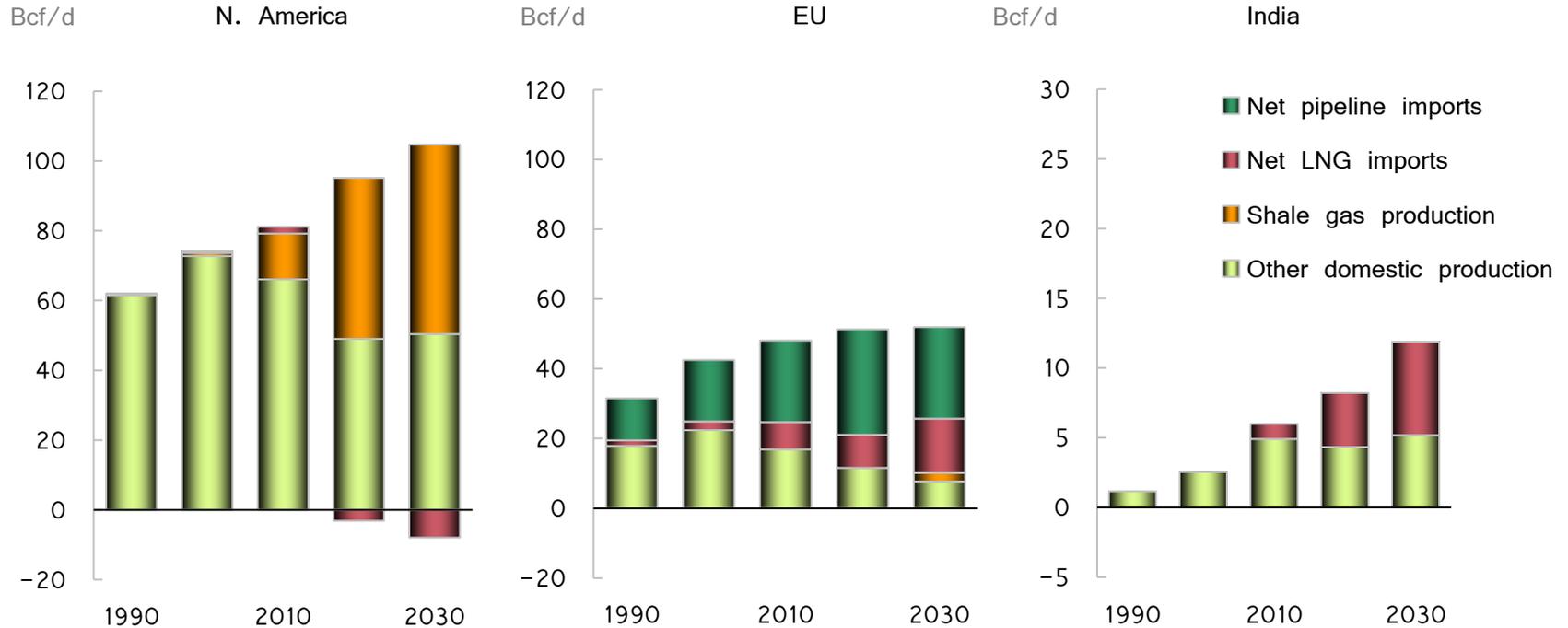
Alternative for #21 - Version 1

Sources of gas supply, by region



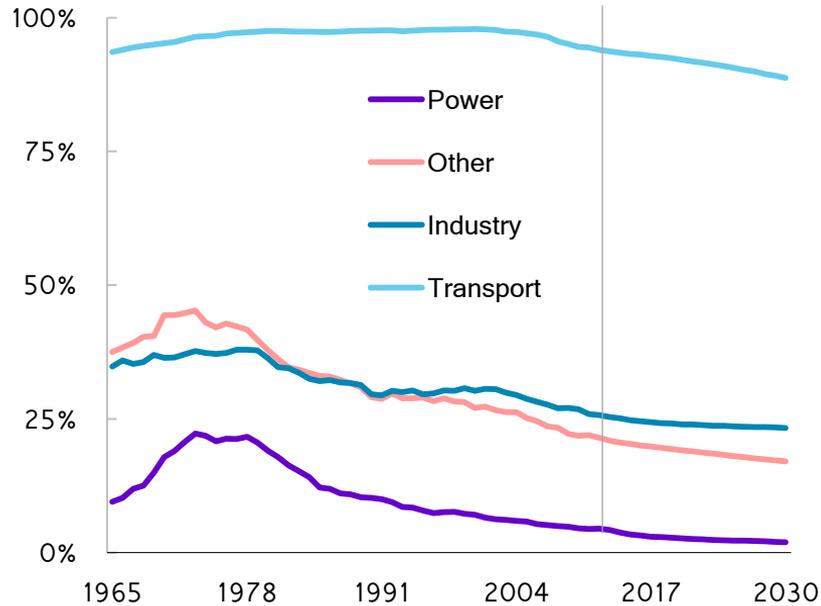
Alternative for #21 - Version 2 (different scales)

Sources of gas supply, by region



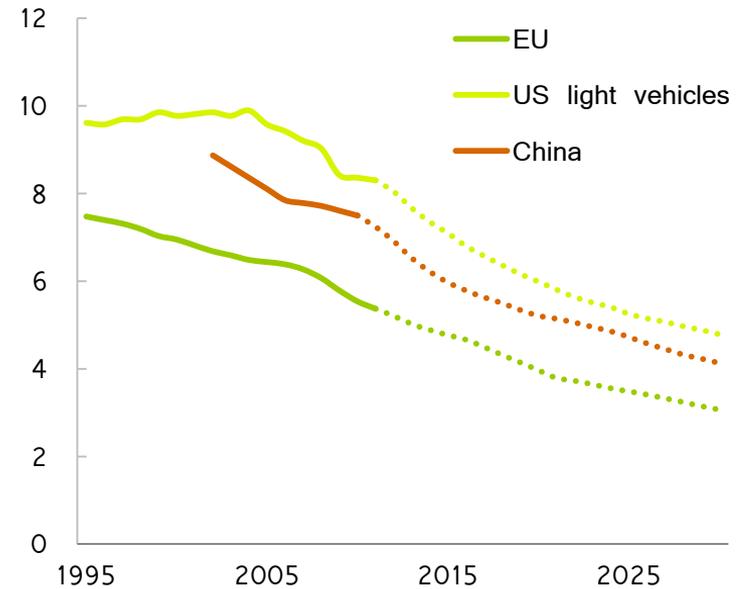
High oil prices are reducing oil's share of primary energy

Oil share in sector



Fuel economy of new cars

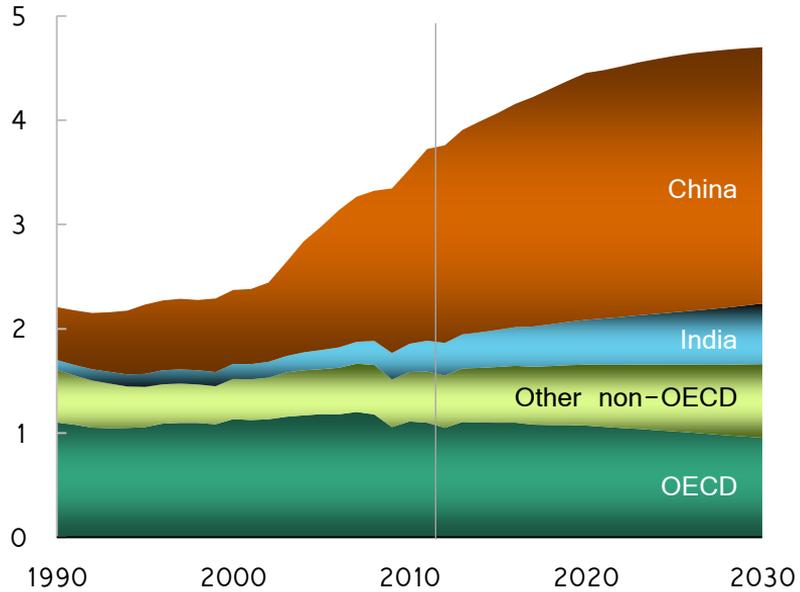
Litres per 100 km



Coal consumption

Coal demand by region

Billion toe



Coal demand by sector

Billion toe

