

BP Energy Outlook 2035

January 2014

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Introduction

Outlook 2035: Global energy trends

Liquid fuels

Natural gas

Coal and non-fossil fuels

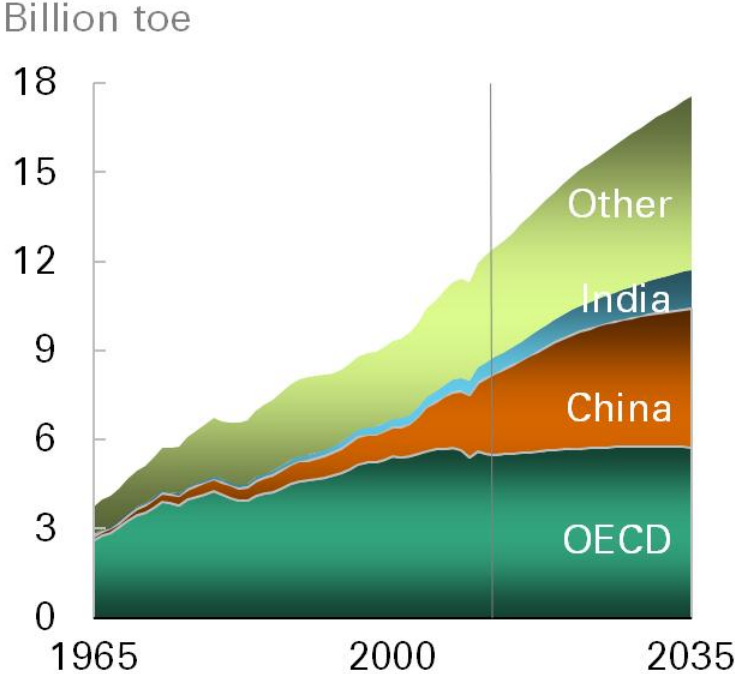
Carbon emissions and the fuel mix

Conclusion

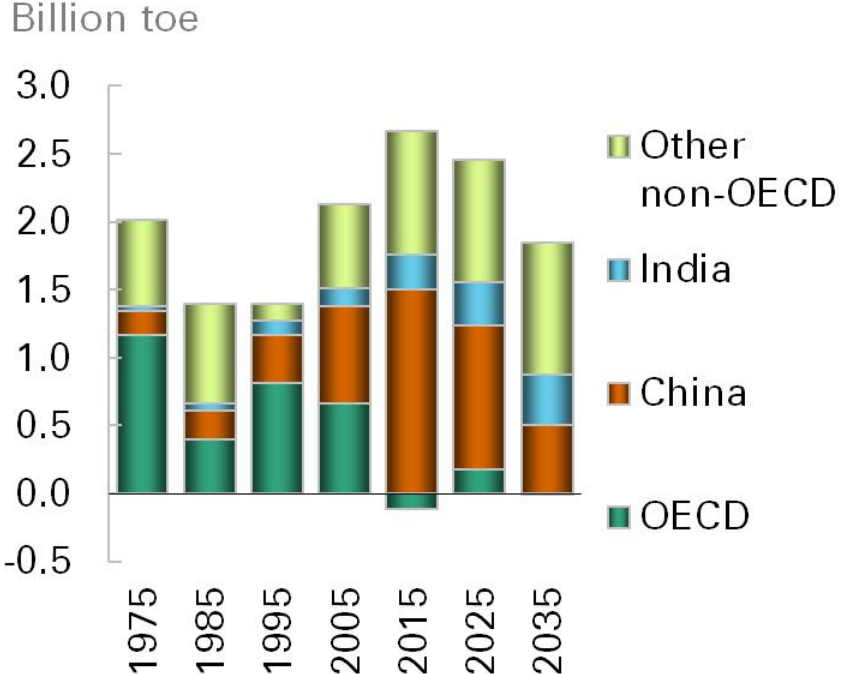


Primary energy consumption growth slows

Consumption by region



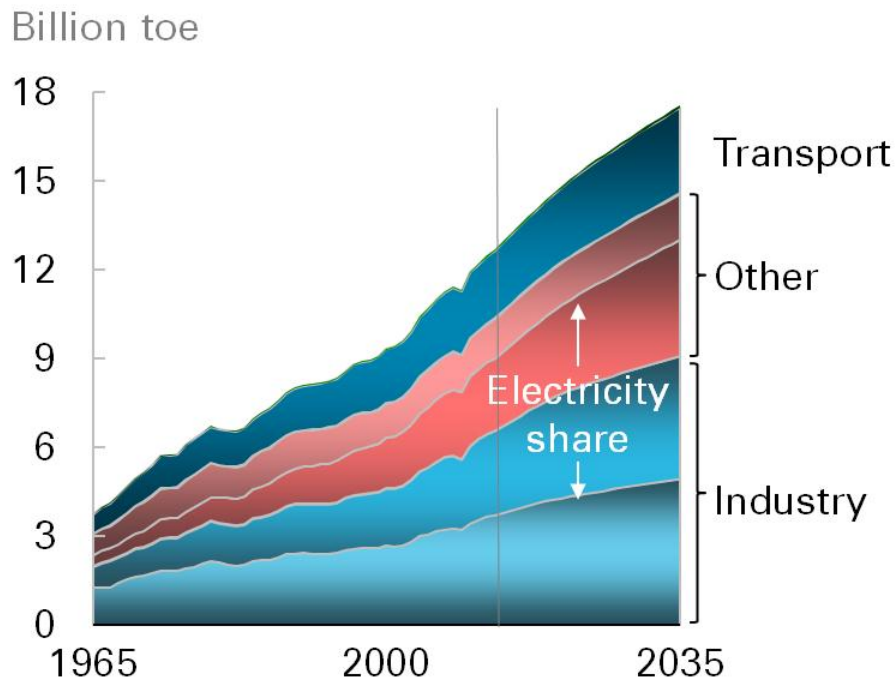
Ten year increments by region



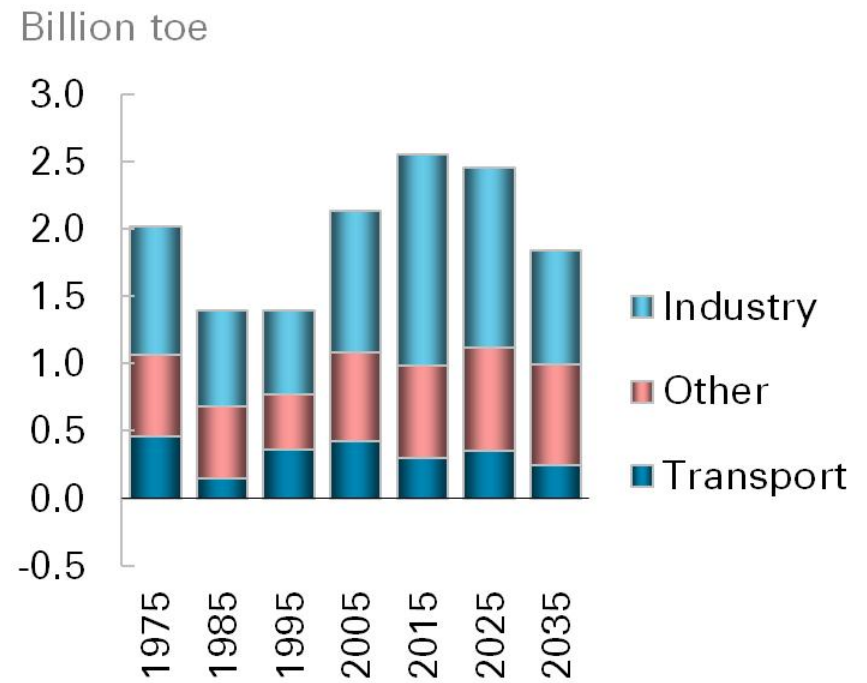


The strong impetus from industrialization starts to fade

Consumption by sector



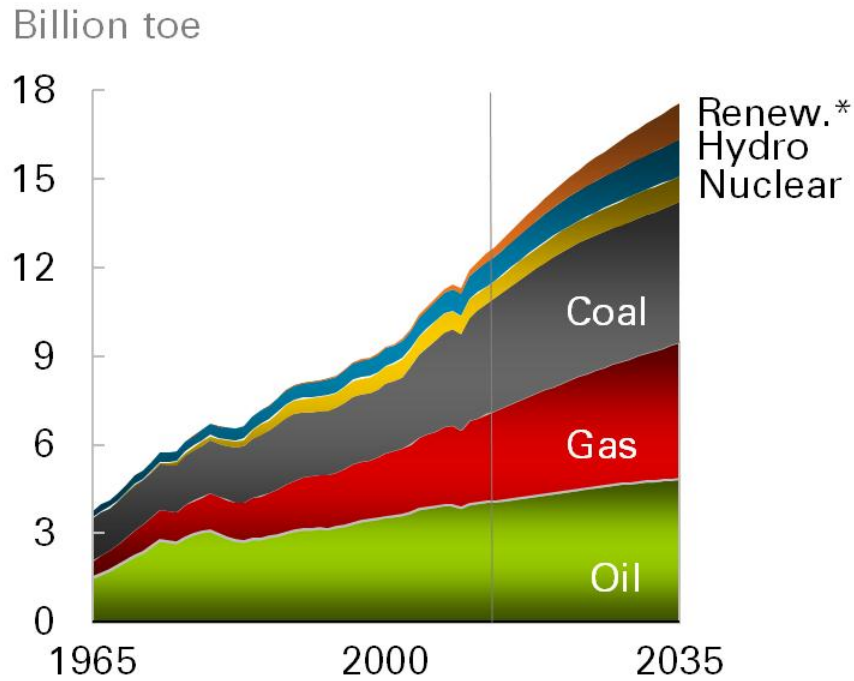
Ten year increments by sector



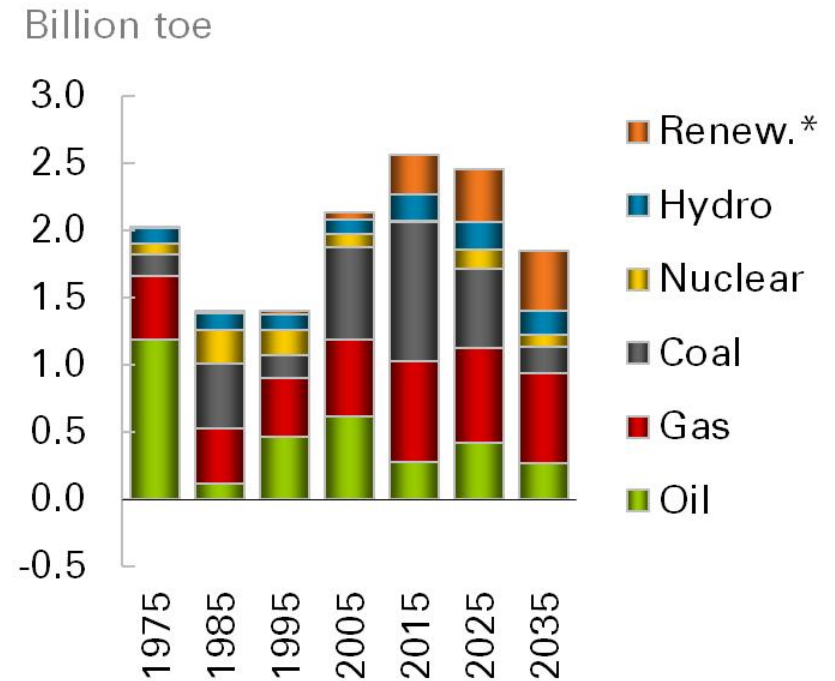


The slowdown in China and industry is reflected in coal

Consumption by fuel



Ten year increments by fuel

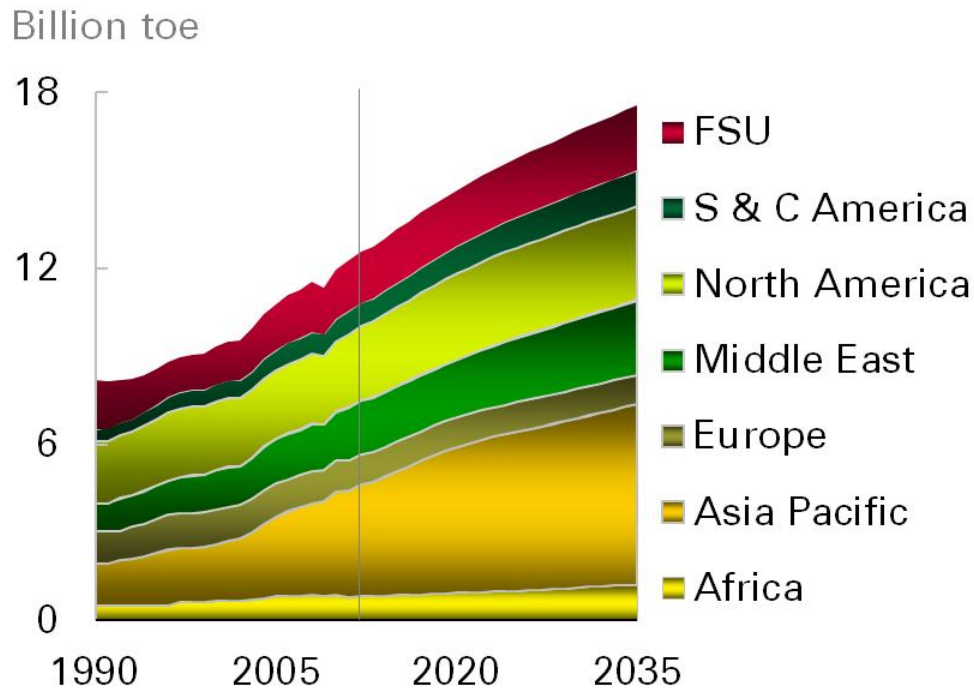


*Includes biofuels

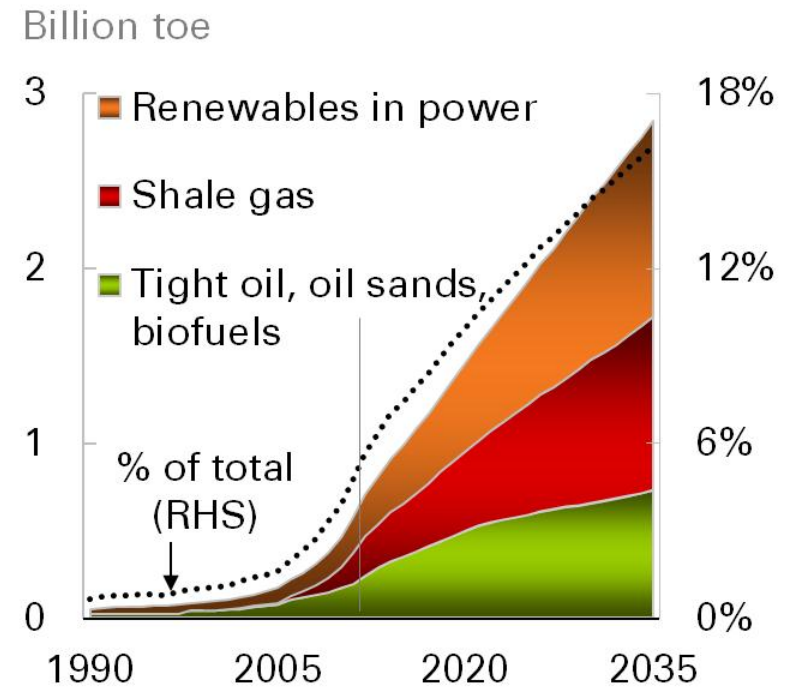


New sources help to supply sufficient energy

Primary energy production



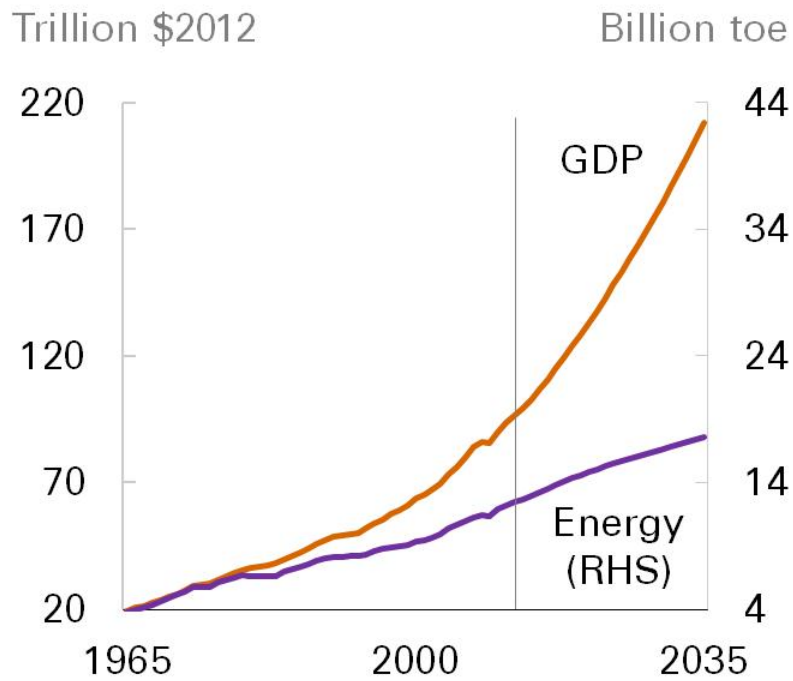
New energy forms



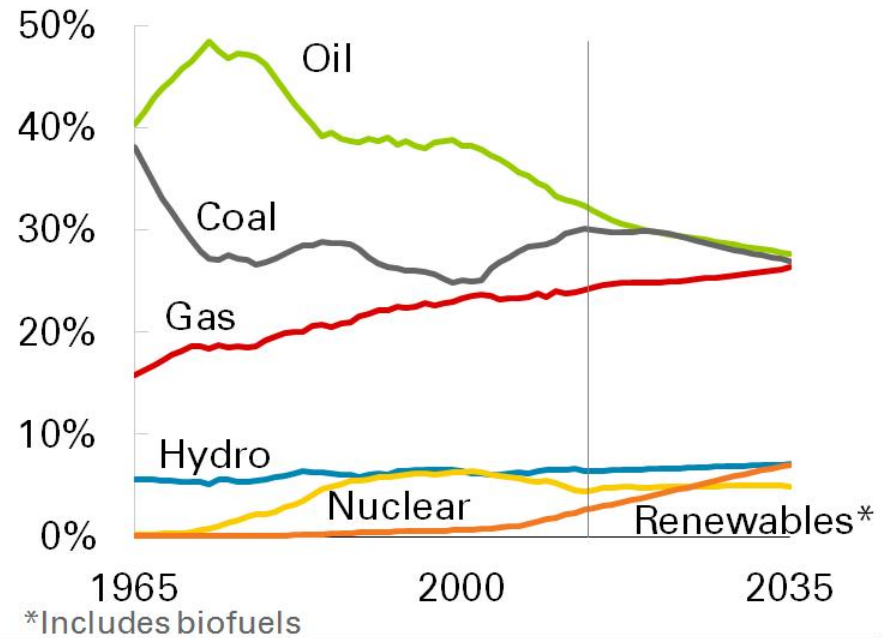


Energy decouples from GDP and fuel mix evolves

GDP and energy



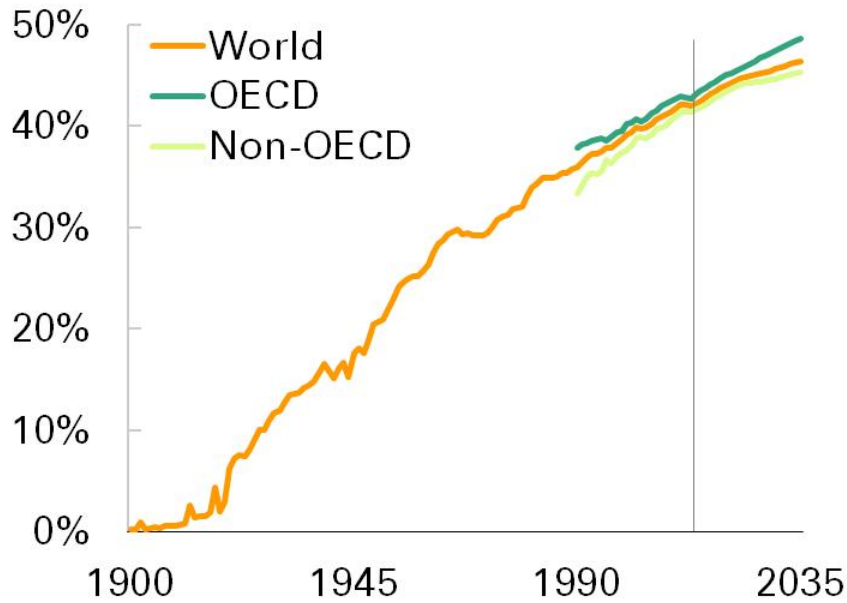
Shares of primary energy



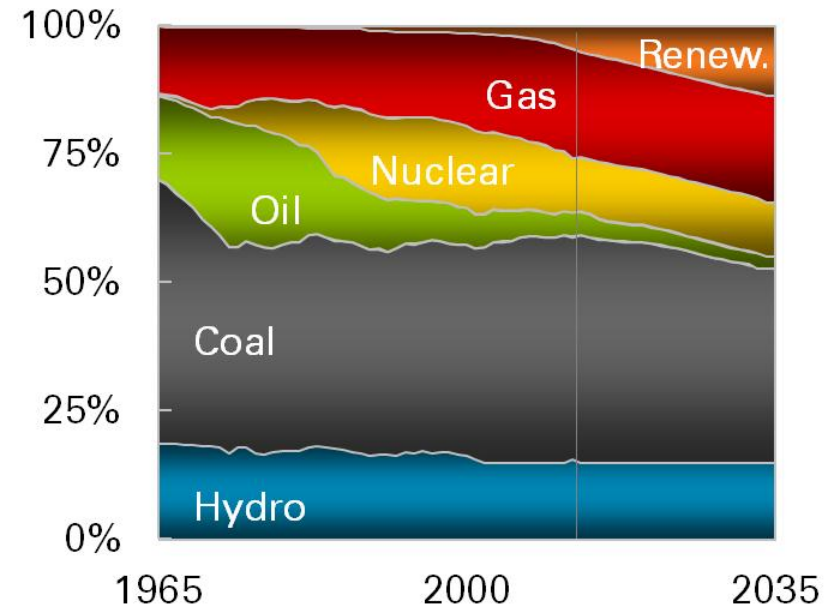


The power sector takes an increasing share of energy

Inputs to power as a share of total primary energy



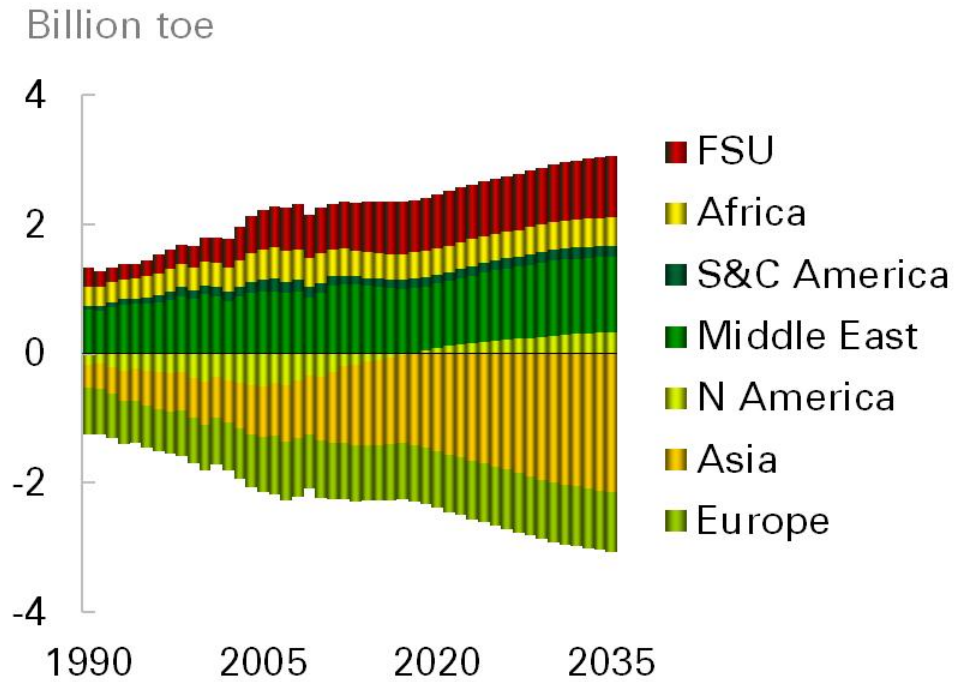
Primary inputs to power



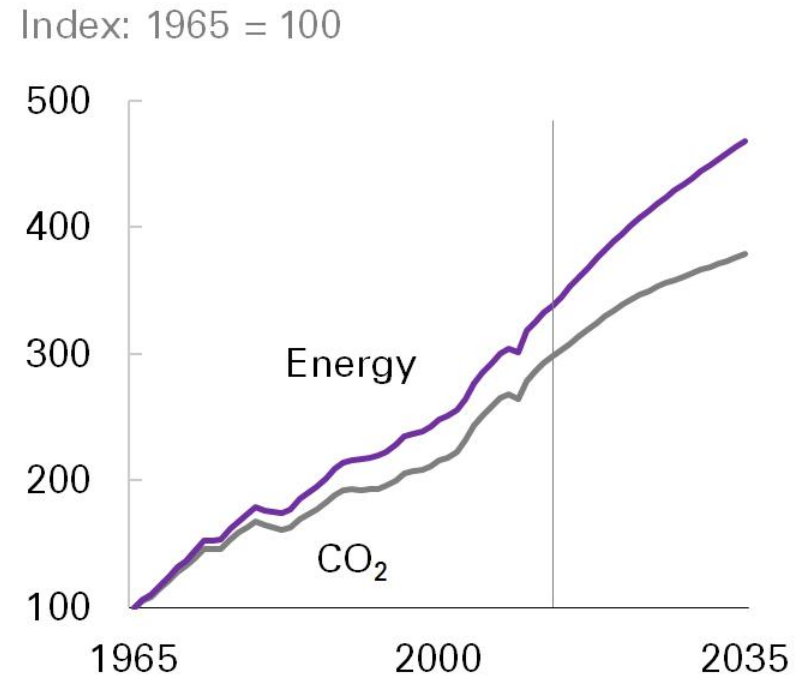


Energy security and sustainability pose challenges

Primary energy net balances



Energy and CO₂ emissions





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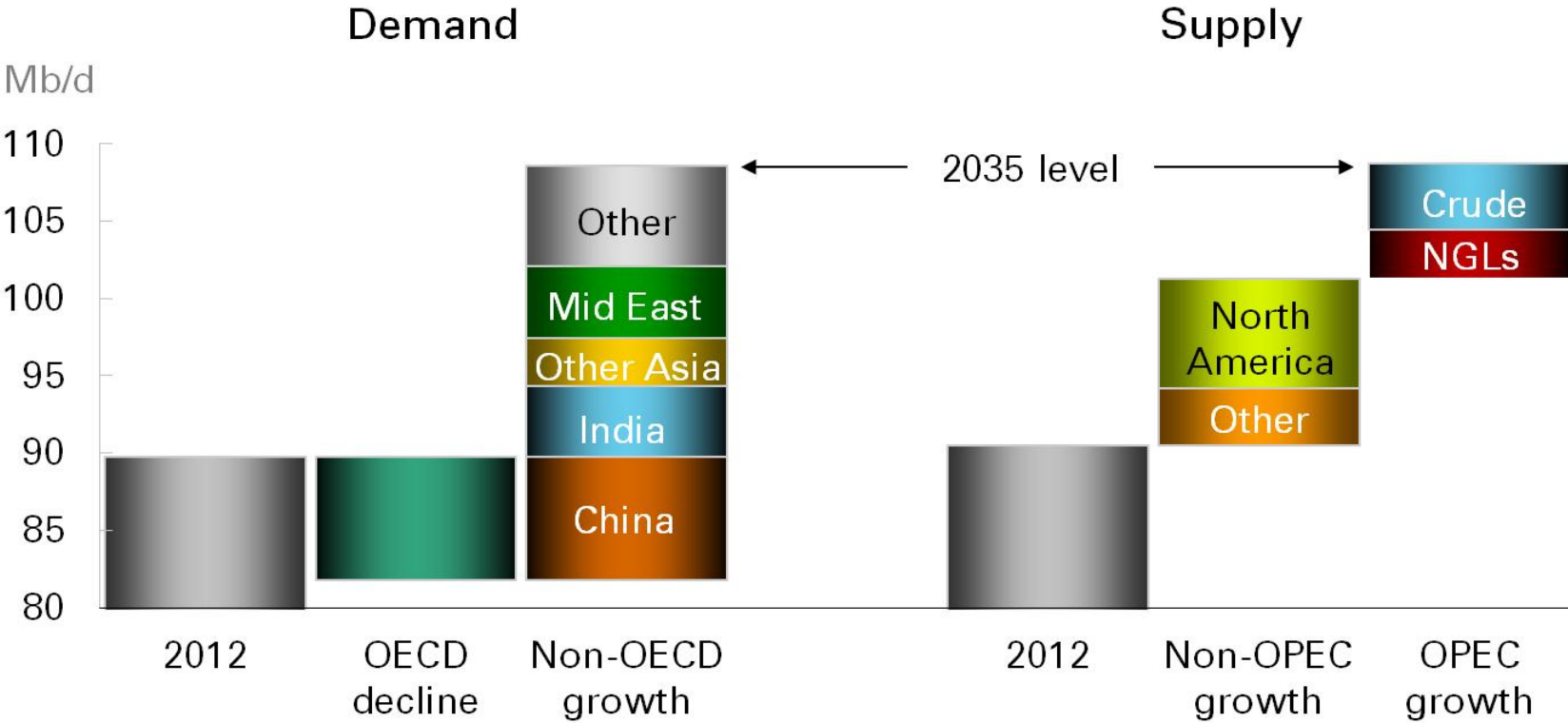
Coal and non-fossil fuels

Carbon emissions and the fuel mix

Conclusion



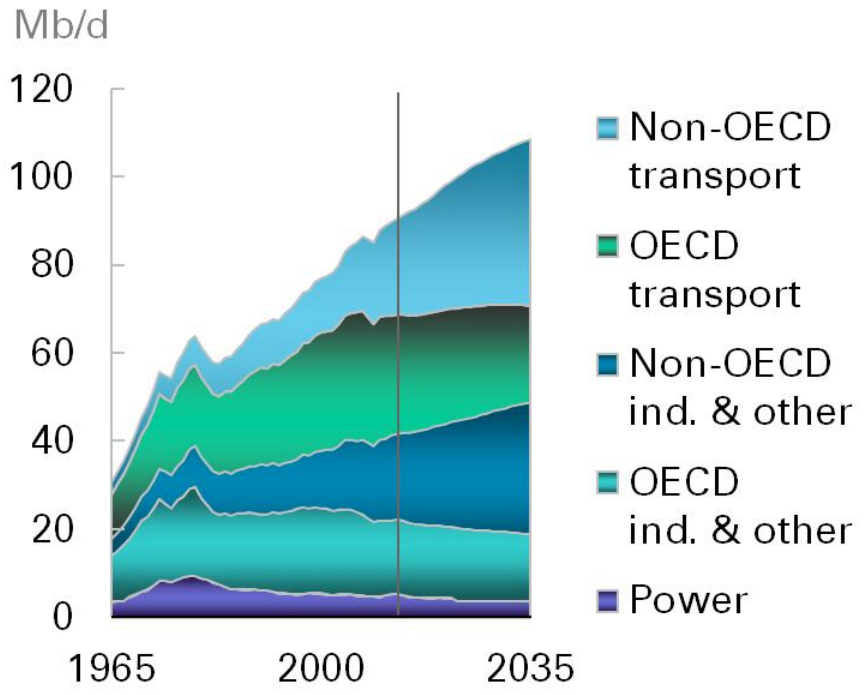
The global liquids balance



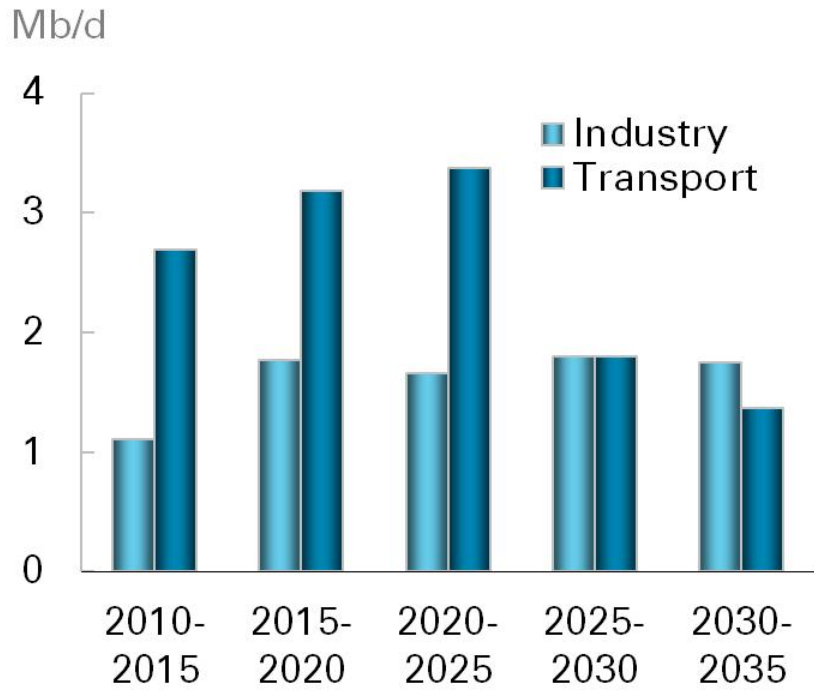


Liquids demand growth is largest in non-OECD transport

Demand by sector



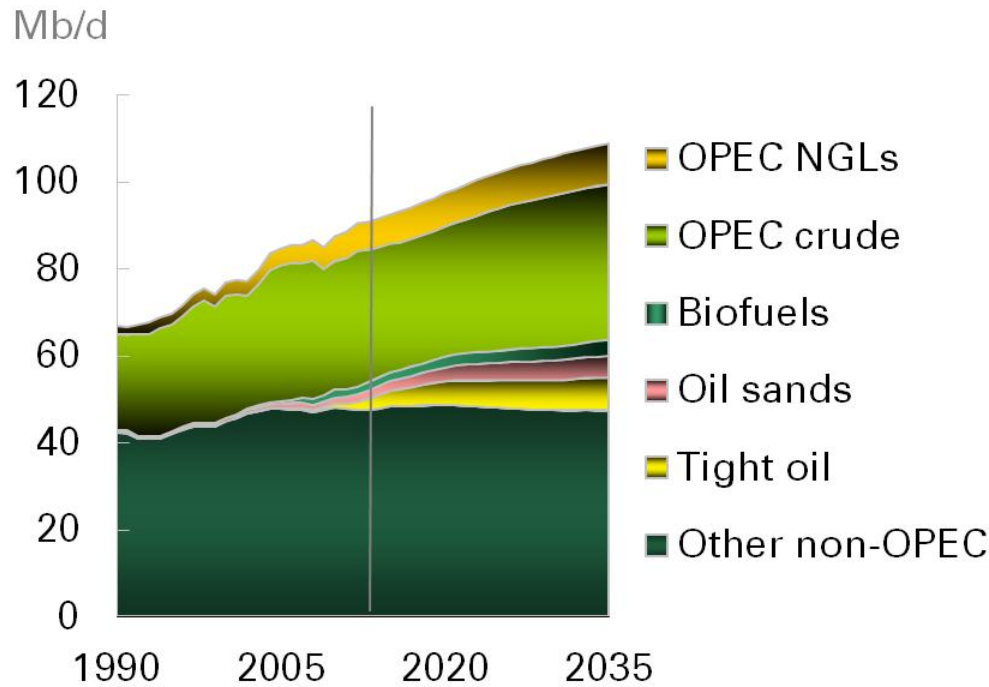
Five year increments



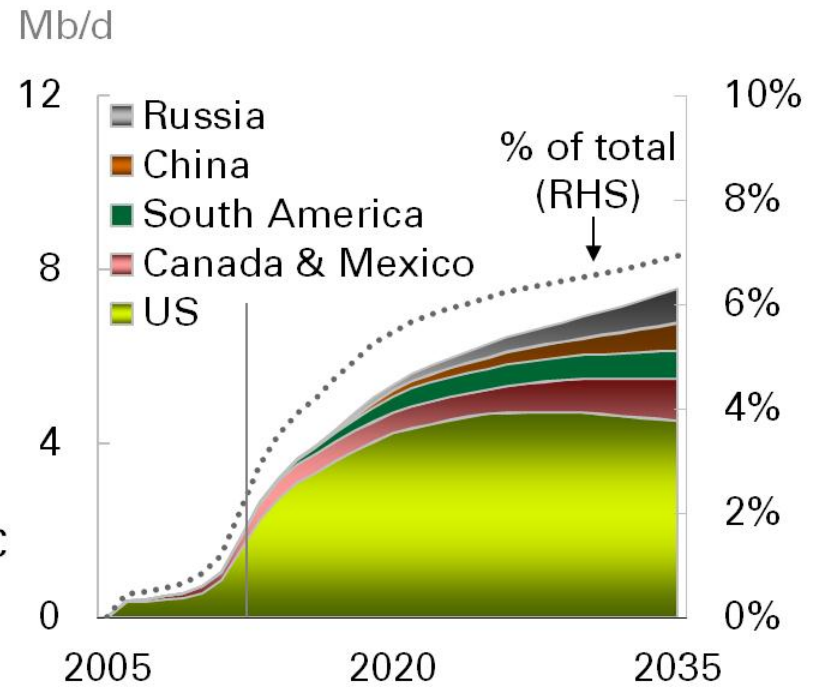


Supply growth is supported initially by unconventional

Liquids supply by type



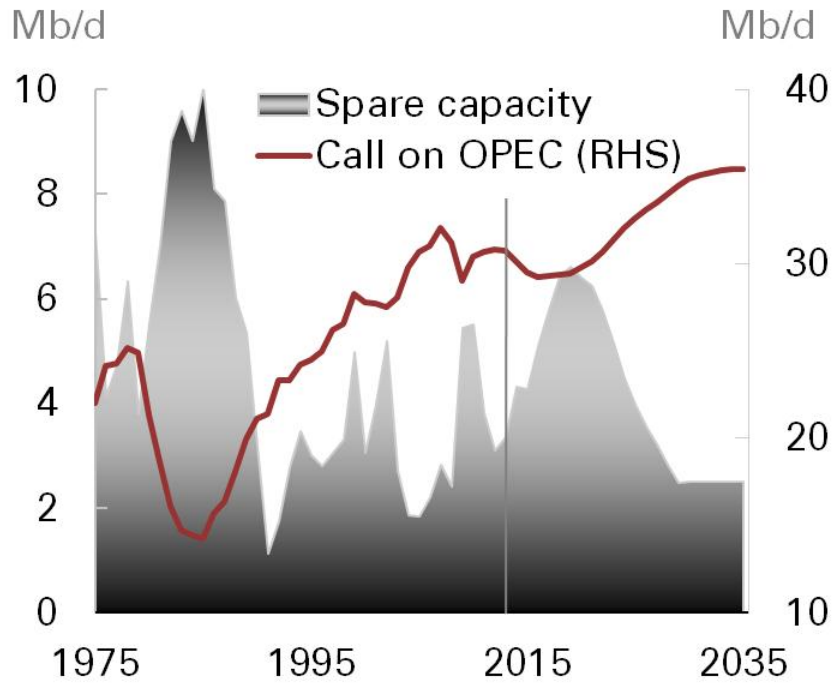
Tight oil supply



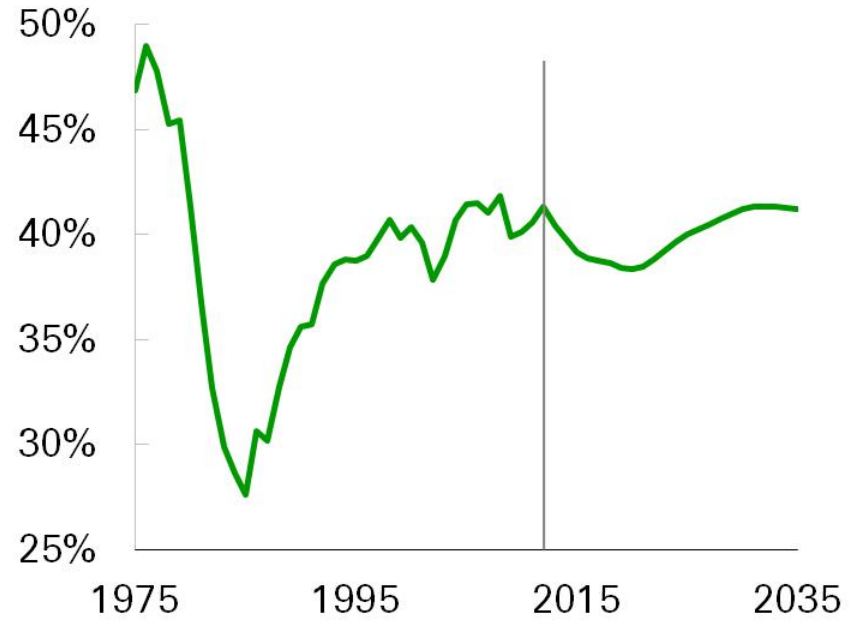


Oil balances suggest OPEC will be challenged

OPEC spare capacity



OPEC share of global supply

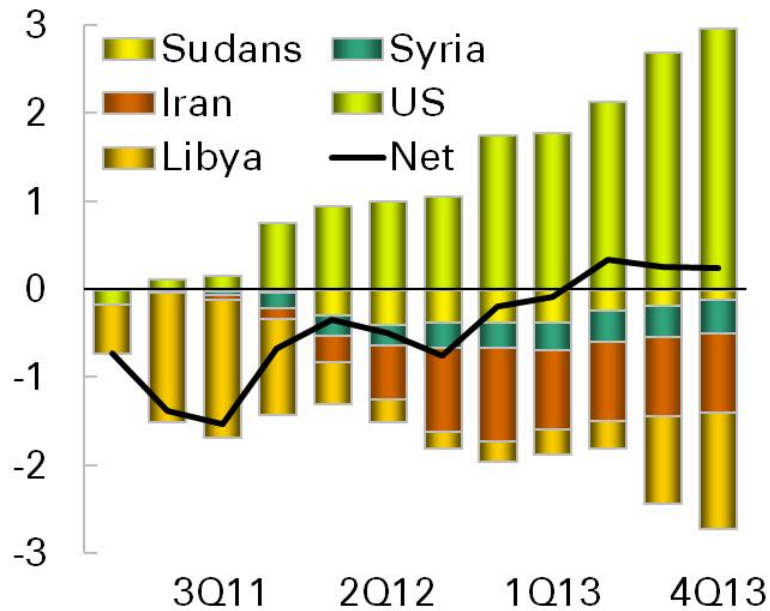




Supply disruptions reduce the immediate impact on OPEC

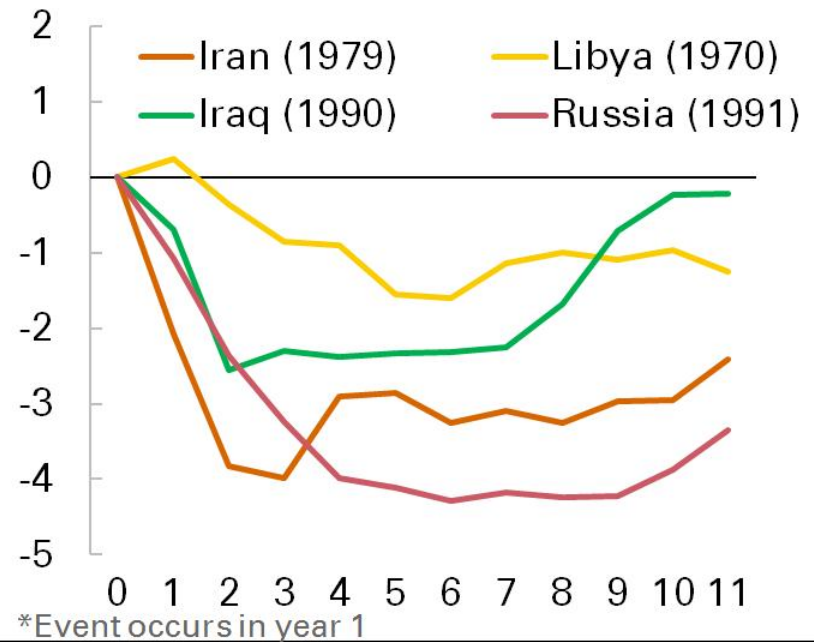
Recent disruptions and US growth

Change since 4Q10, Mb/d



Historical disruptions

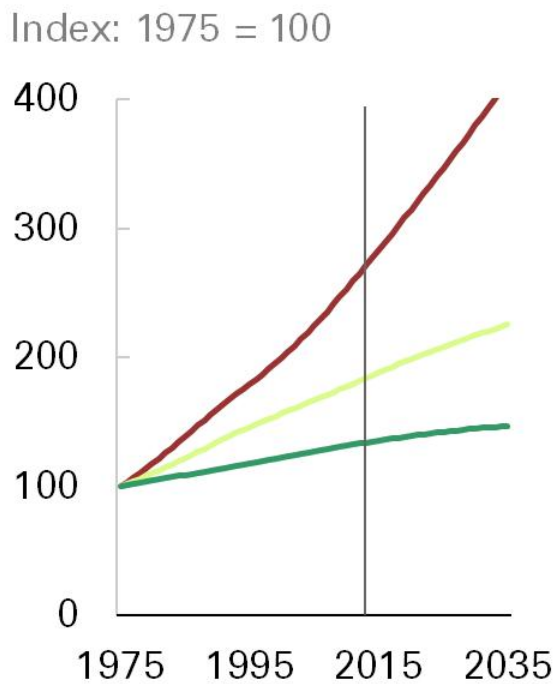
Change from pre-disruption level*, Mb/d



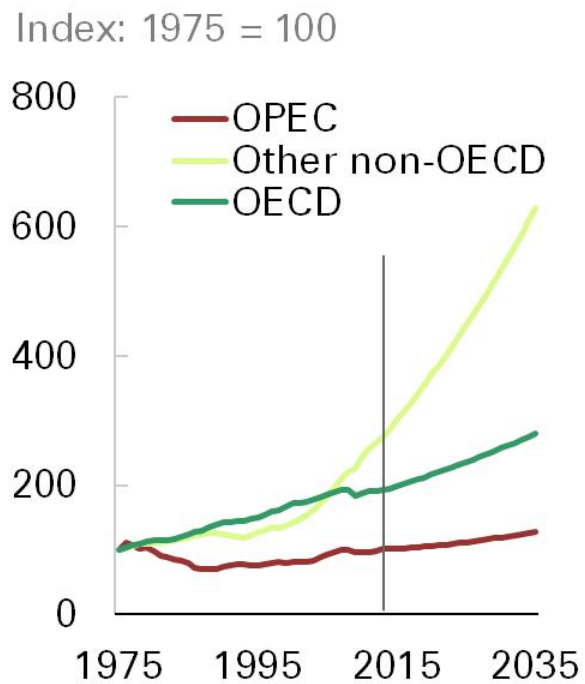
OPEC countries face pressure from rising populations



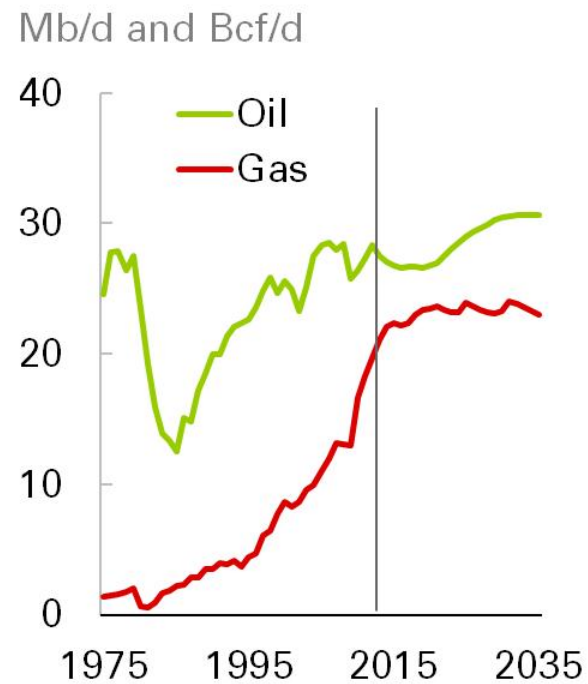
Population



GDP per capita

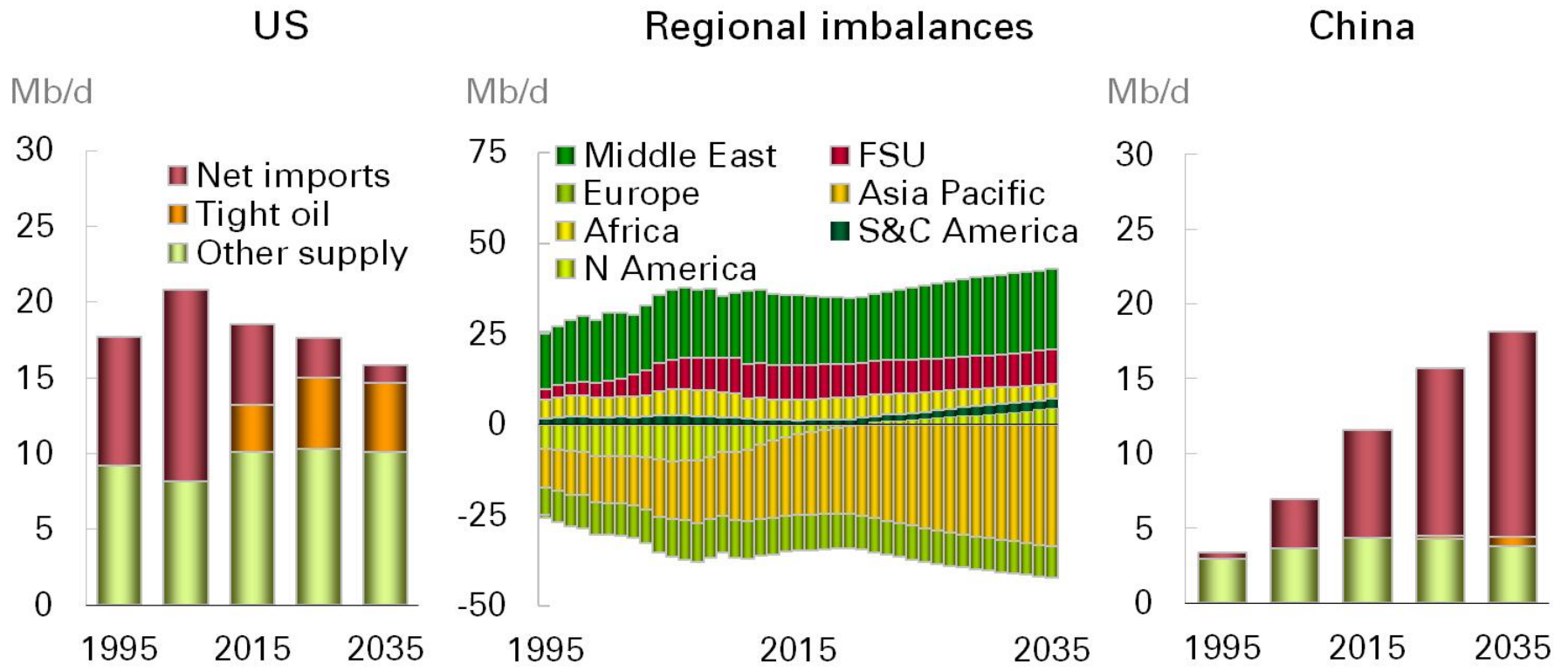


OPEC exports



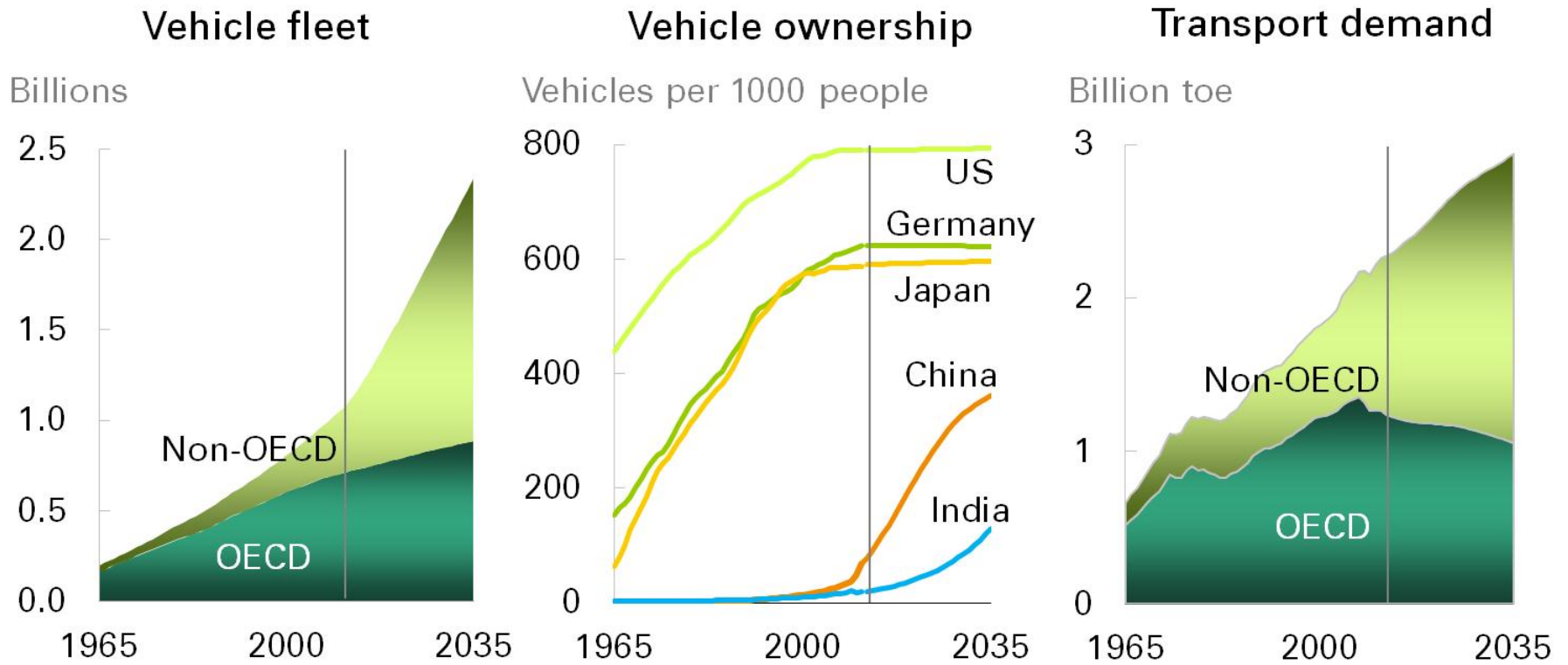


Oil trade continues to shift from West to East





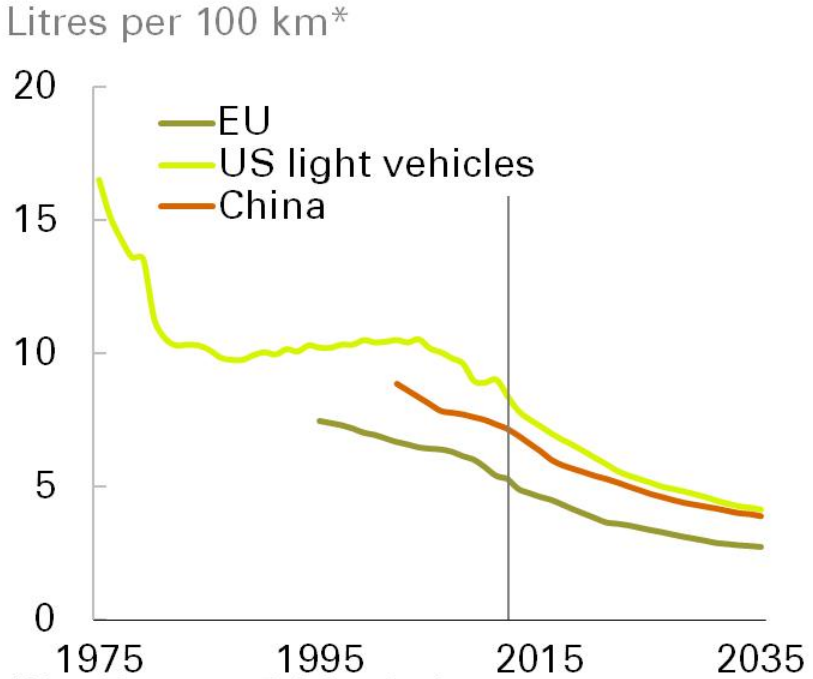
Vehicle numbers are set to grow rapidly in the non-OECD





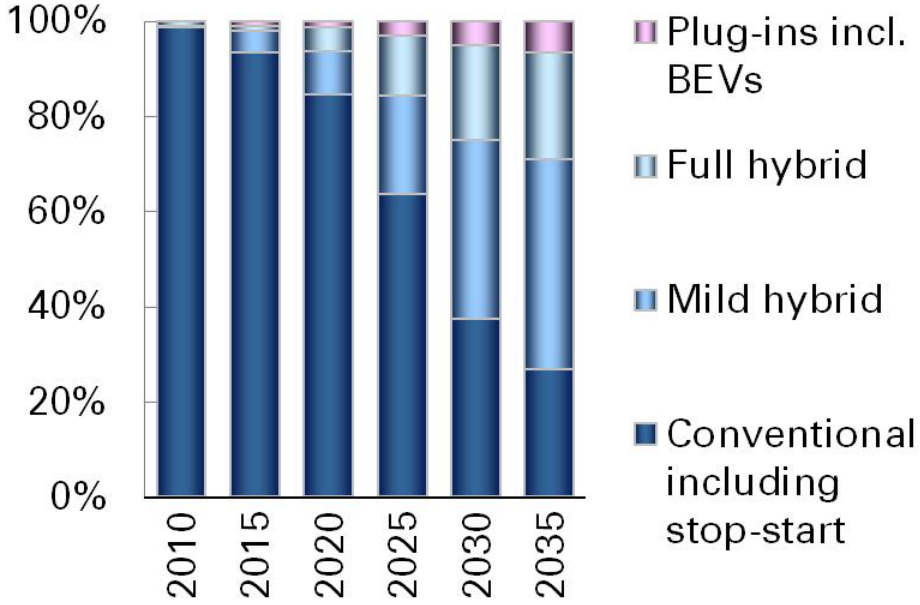
Policy and technology enable efficiency improvements

Fuel economy of new cars



*New European Driving Cycle

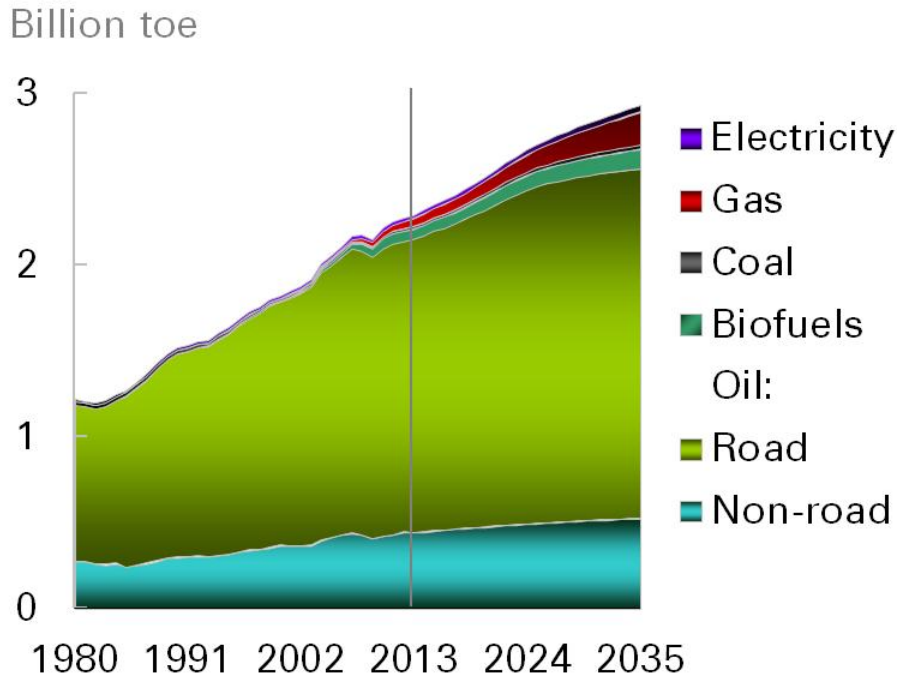
Vehicle sales by type



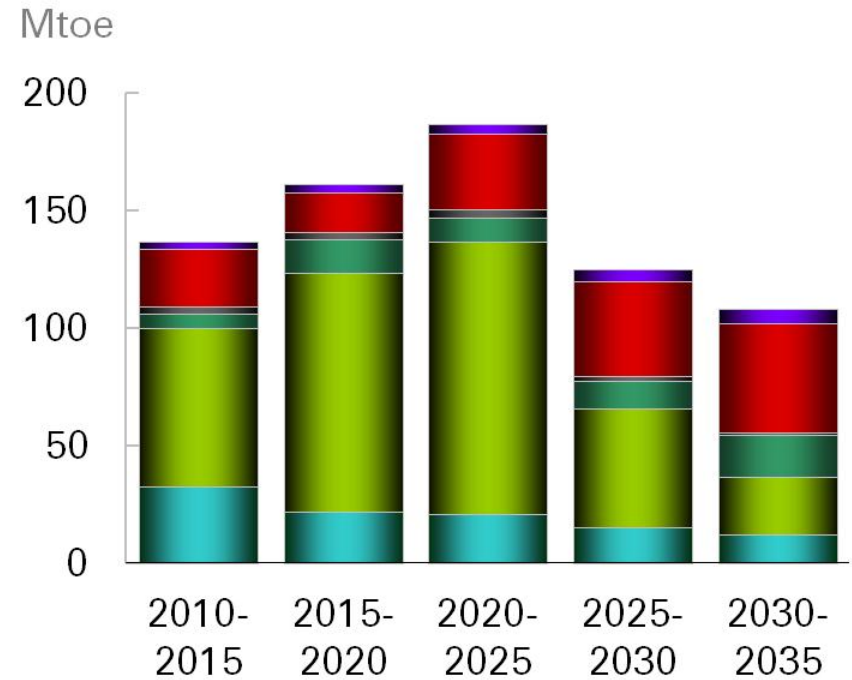
Global transport demand growth slows



Transport demand by fuel



Five year increments by fuel





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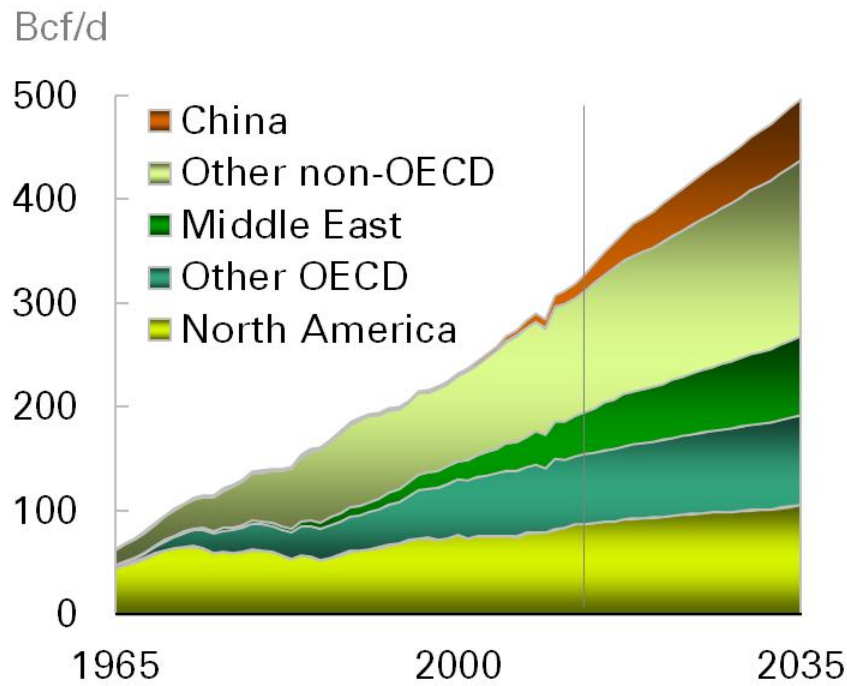
Carbon emissions and the fuel mix

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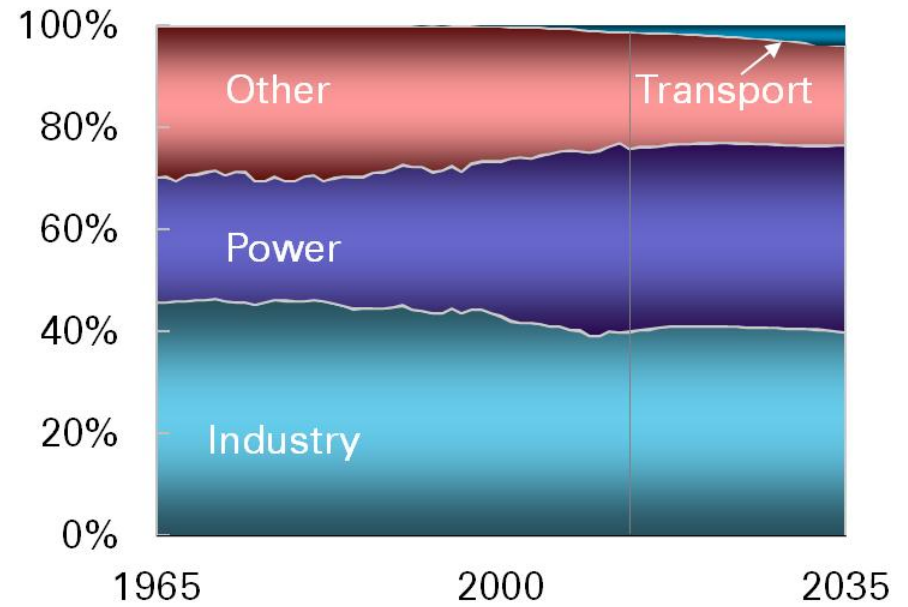


Natural gas demand grows in all regions and sectors

Demand by region



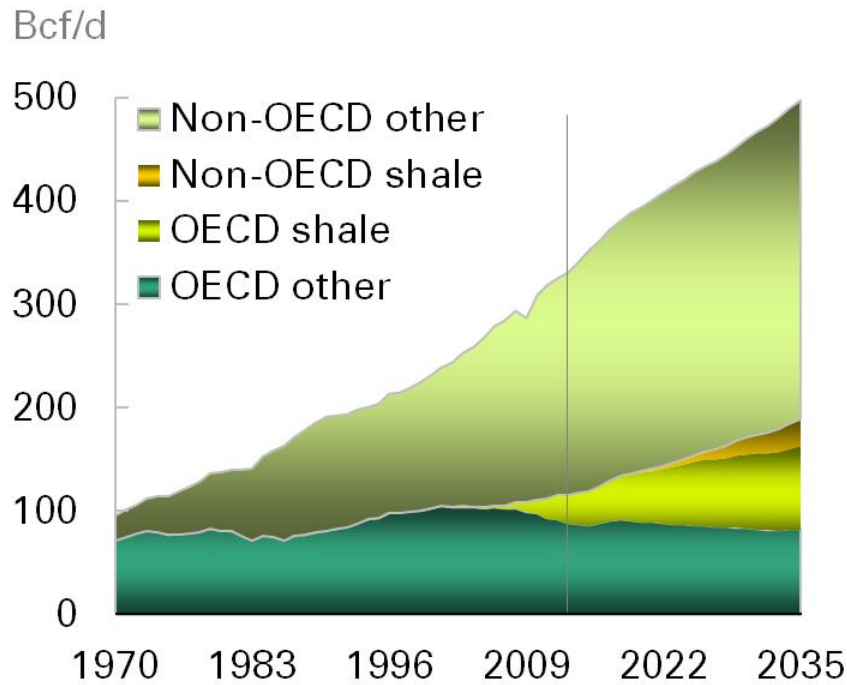
Demand by sector



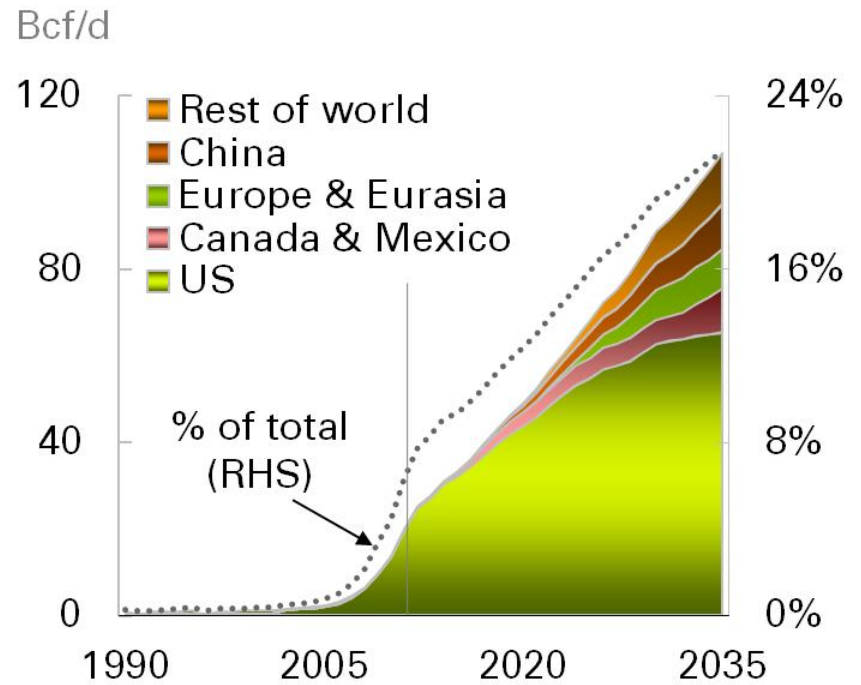


Shale gas shows the fastest production growth

Gas production by type and region



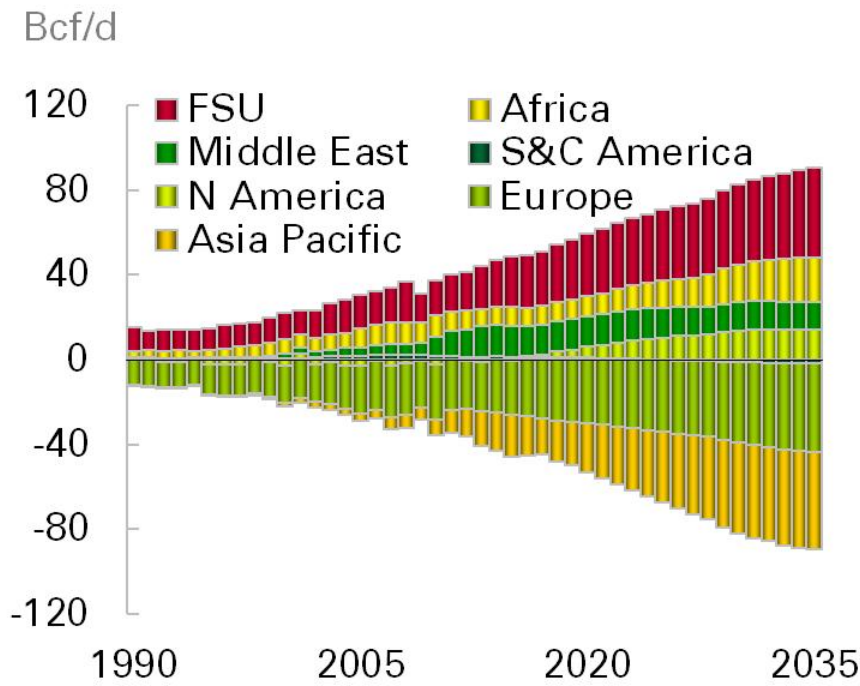
Shale gas production



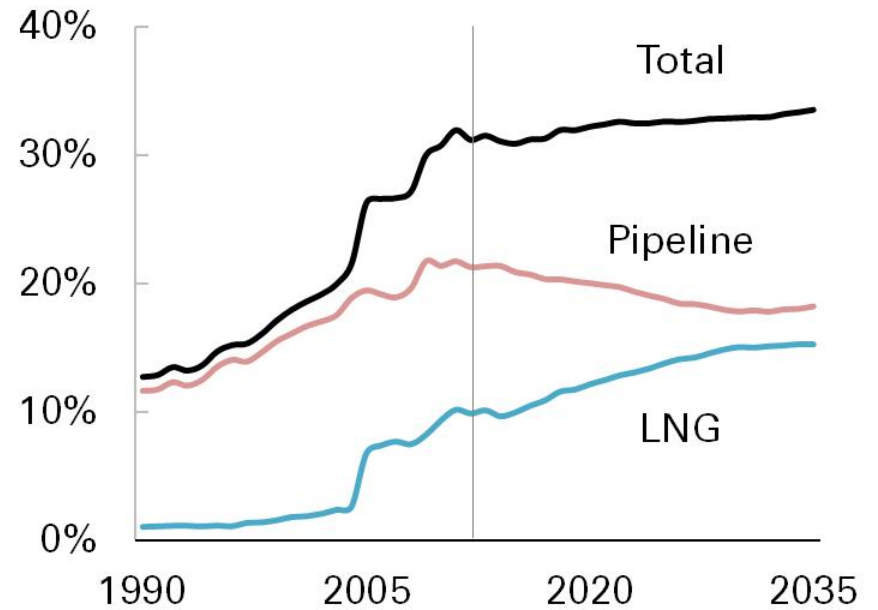
Gas trade continues to expand



Regional net exports



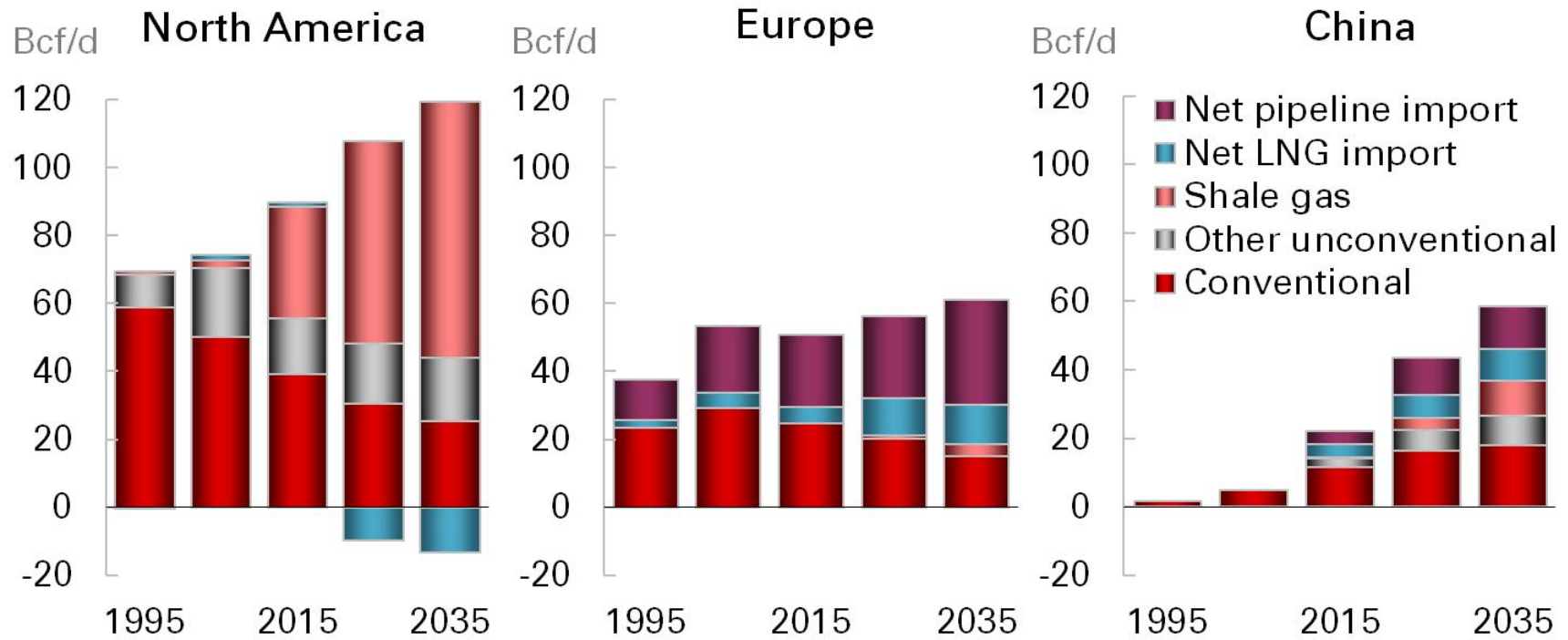
Imports share of consumption





Regional supply patterns differ

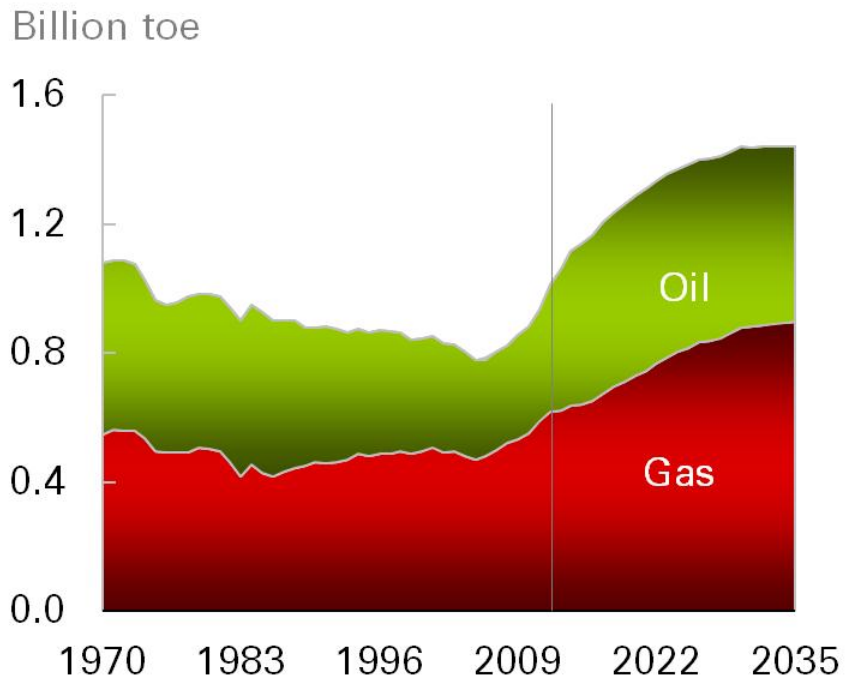
Sources of gas supply by region



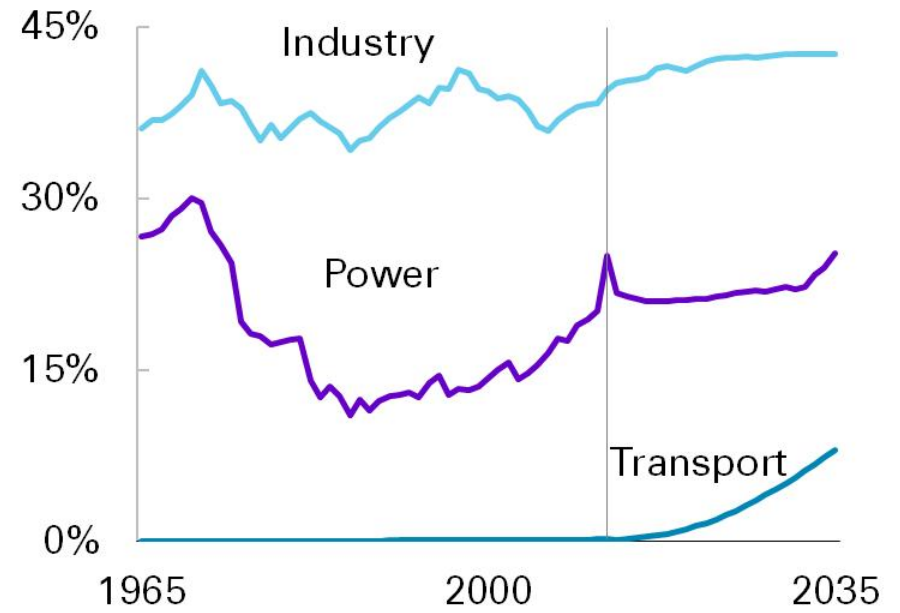


The US shale revolution leads to market adjustments

US oil and gas supply



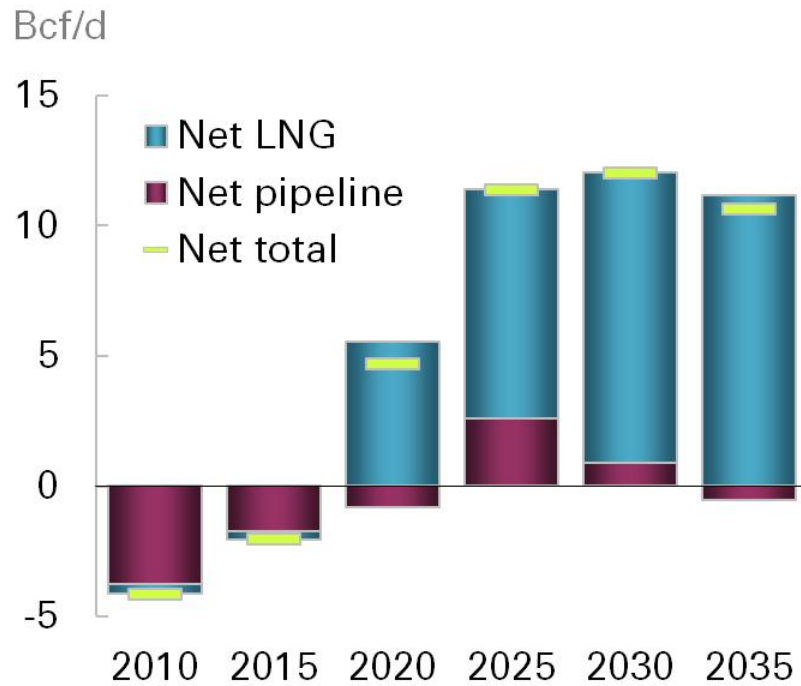
Gas share of US sector demand



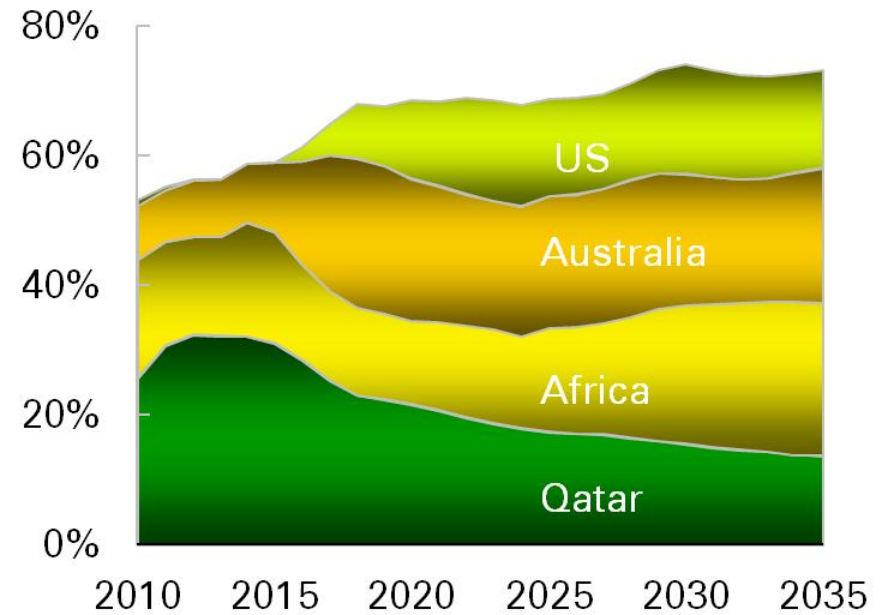


Shale gas changes the US and global gas trade picture

US natural gas exports



Share of global LNG trade





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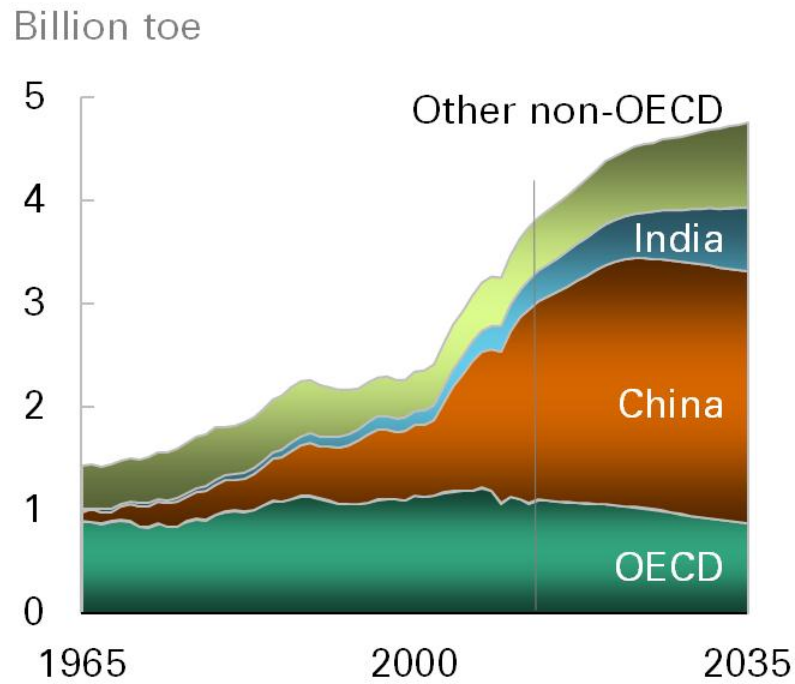
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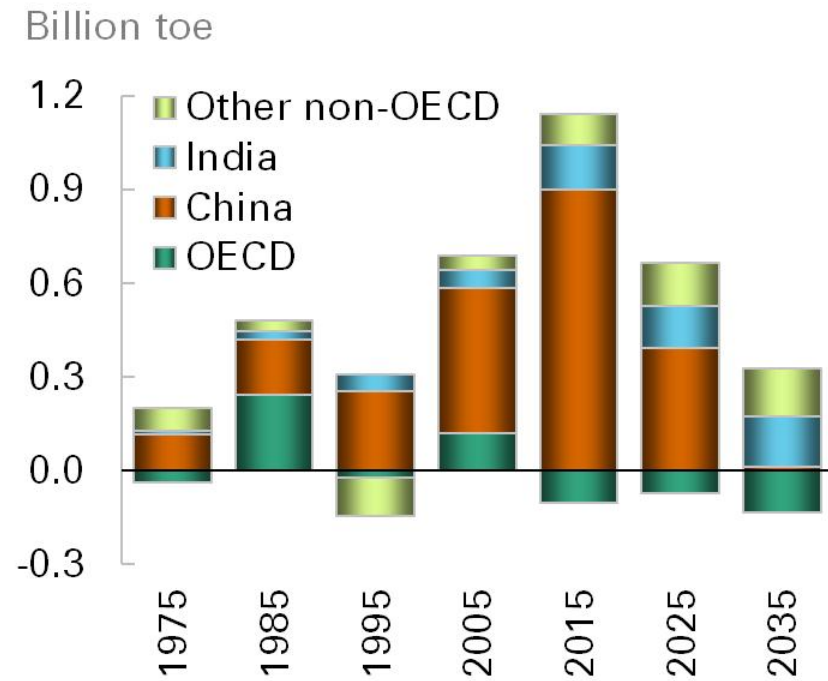


Coal consumption growth slows in the non-OECD

Consumption by region



Ten year increments by region



Non-fossil fuels grow rapidly

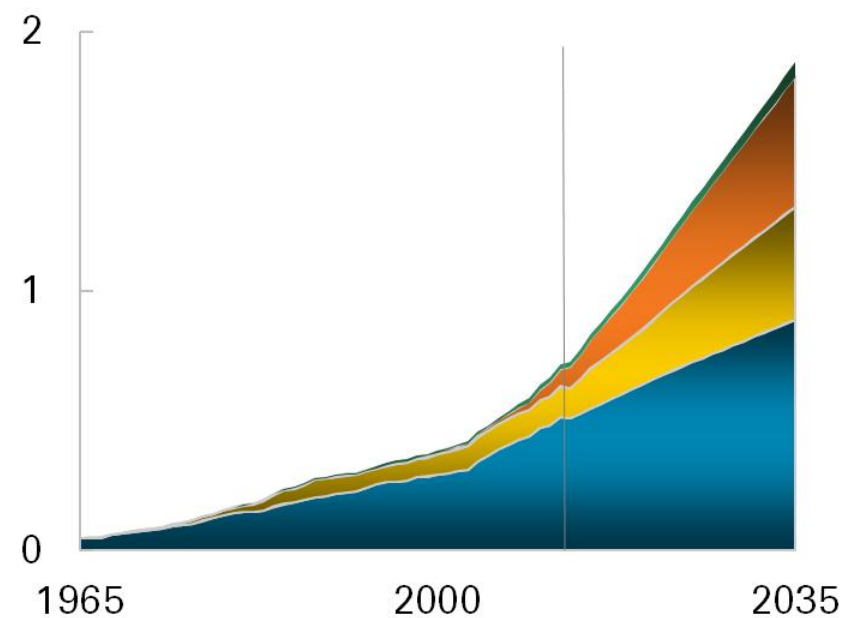
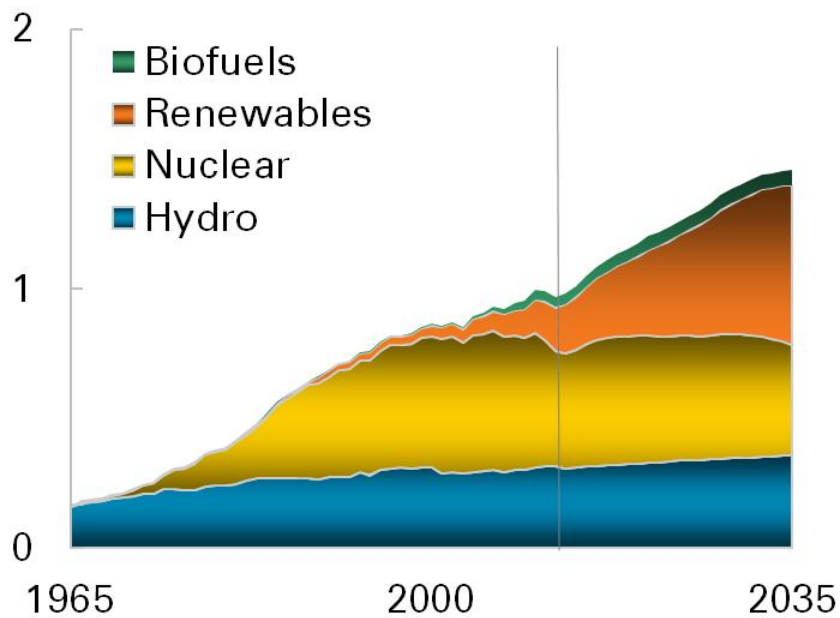


OECD

Non-OECD

Billion toe

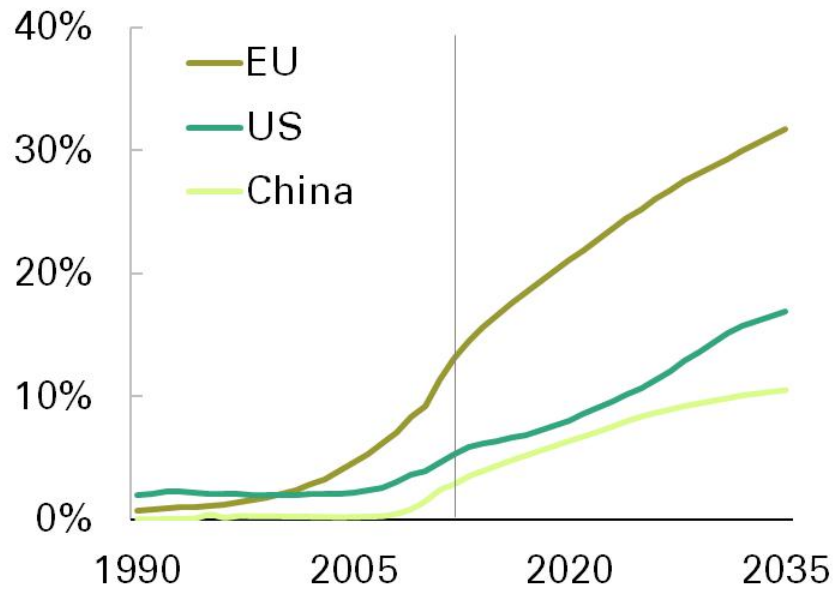
Billion toe



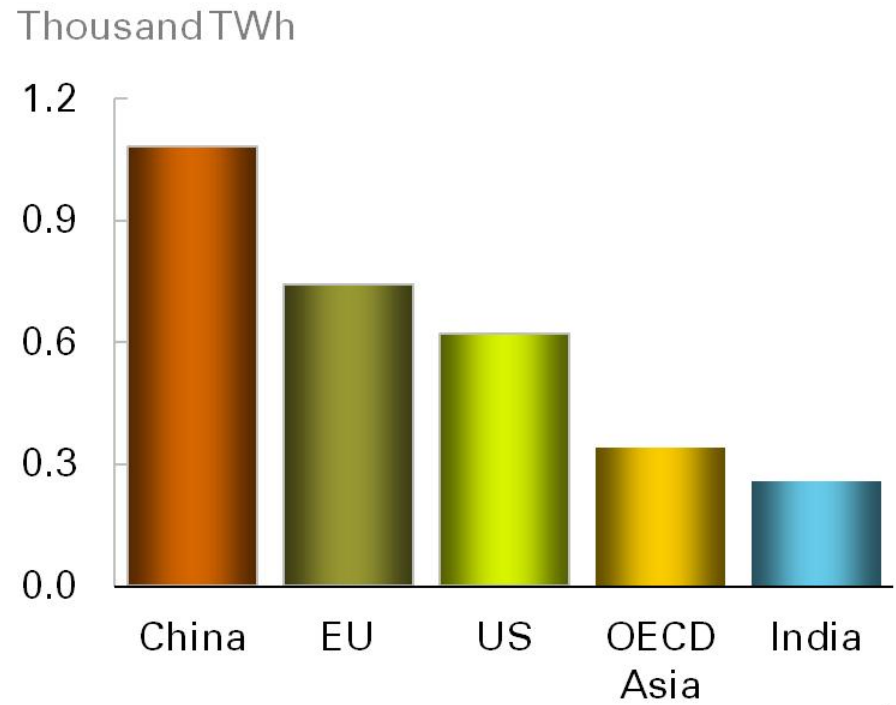


Renewables in power gain share most rapidly in Europe

Renewables share of power



Renewables growth 2012-35





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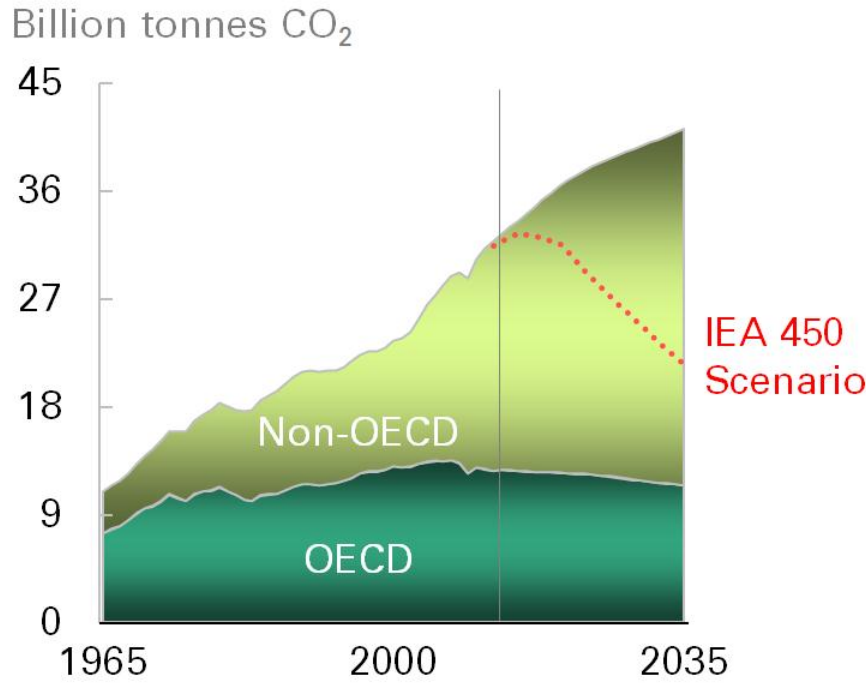
Carbon emissions and the fuel mix

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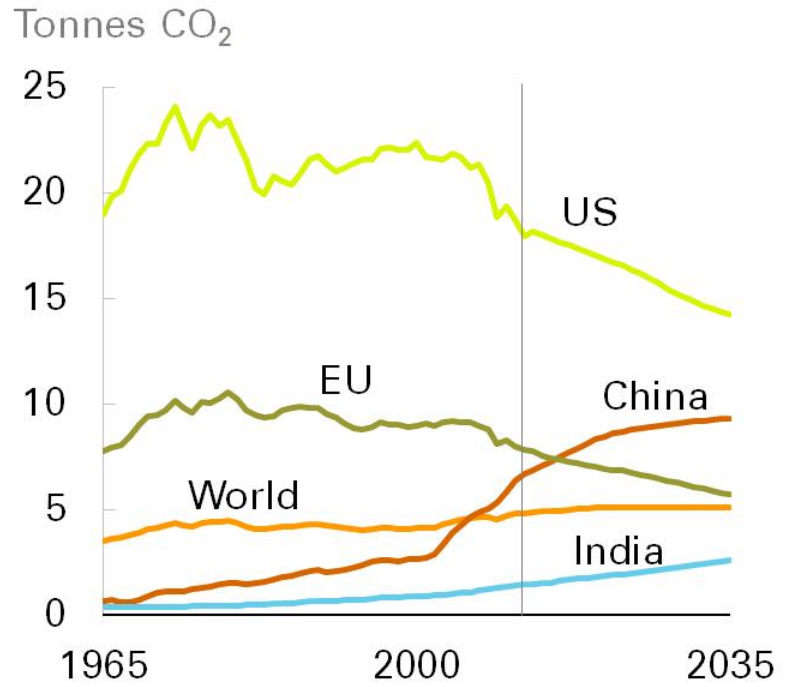


CO₂ emissions from energy use continue to rise

Emissions by region



Emissions per capita

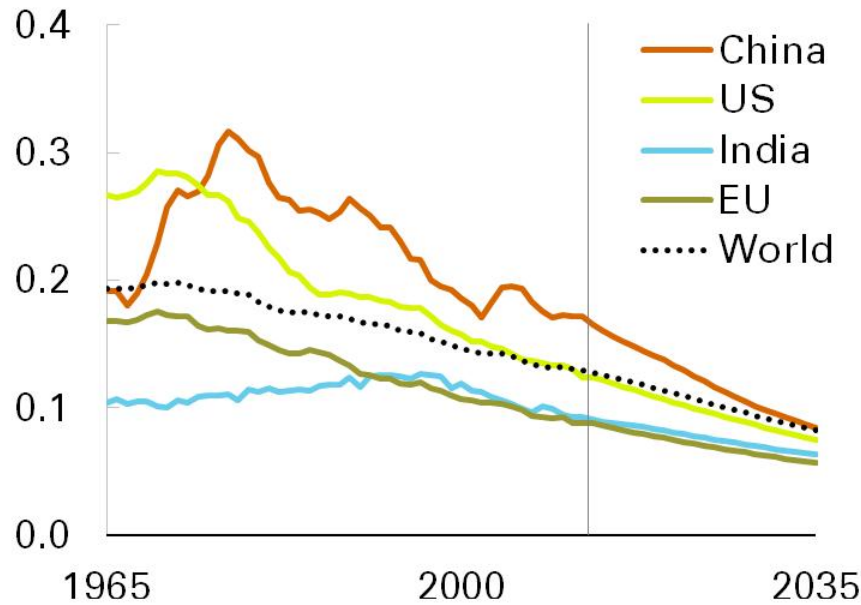




Energy intensity and carbon intensity follow different patterns

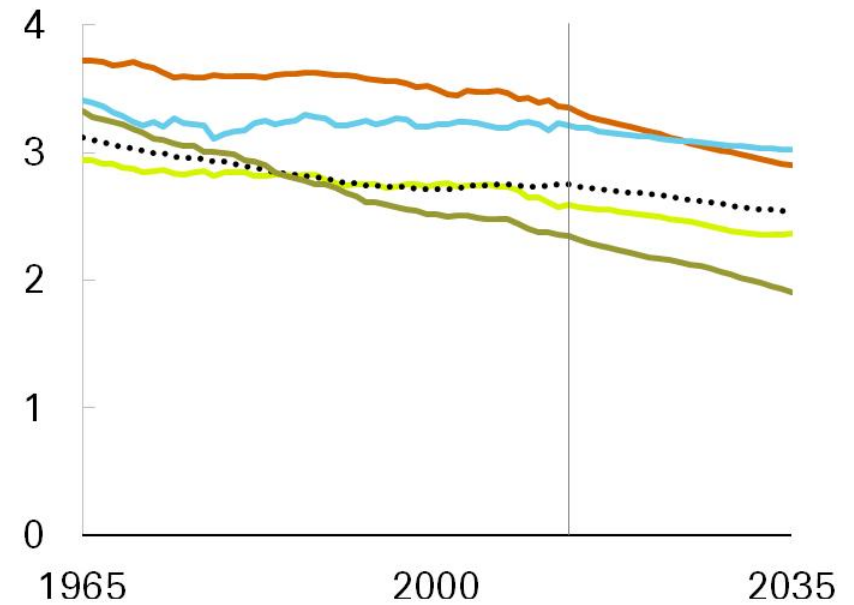
Energy intensity

Toe per thousand \$2012 GDP



Carbon intensity

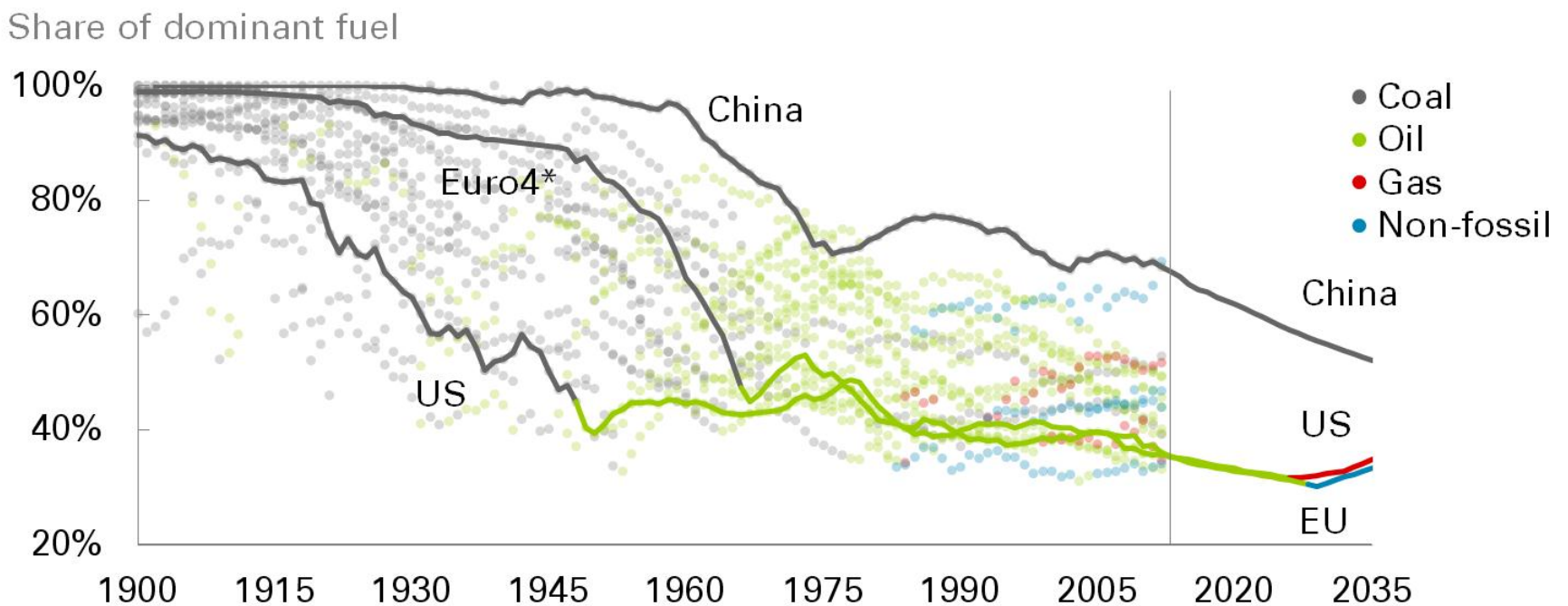
Tonnes CO₂ per toe





The fuel mix diversifies over time

Evolution of the fuel mix in 20 major countries

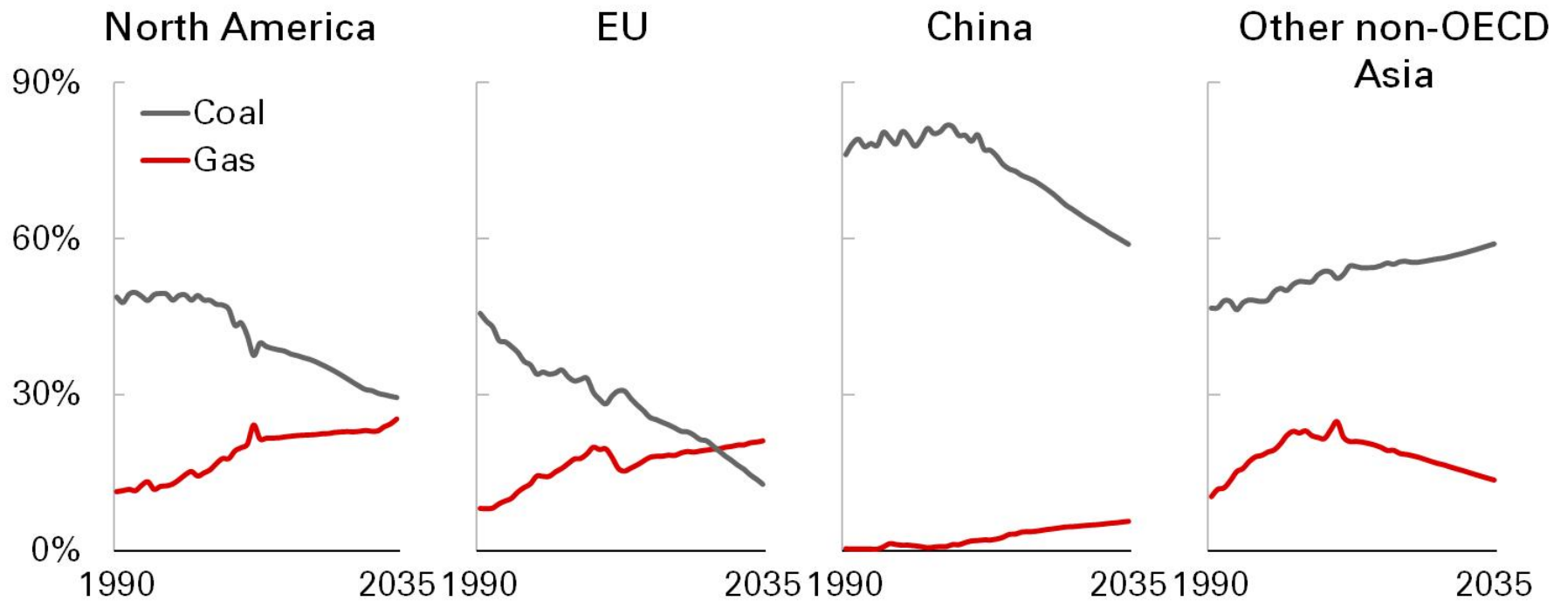


*France, Germany, Italy and United Kingdom pre-1965



The power sector is the main driver of fuel mix changes

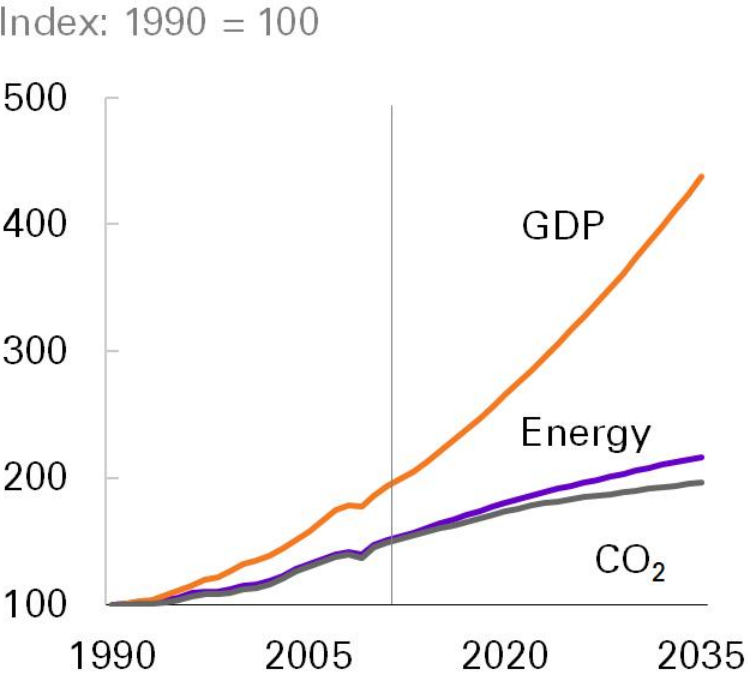
Share of power sector fuel consumption



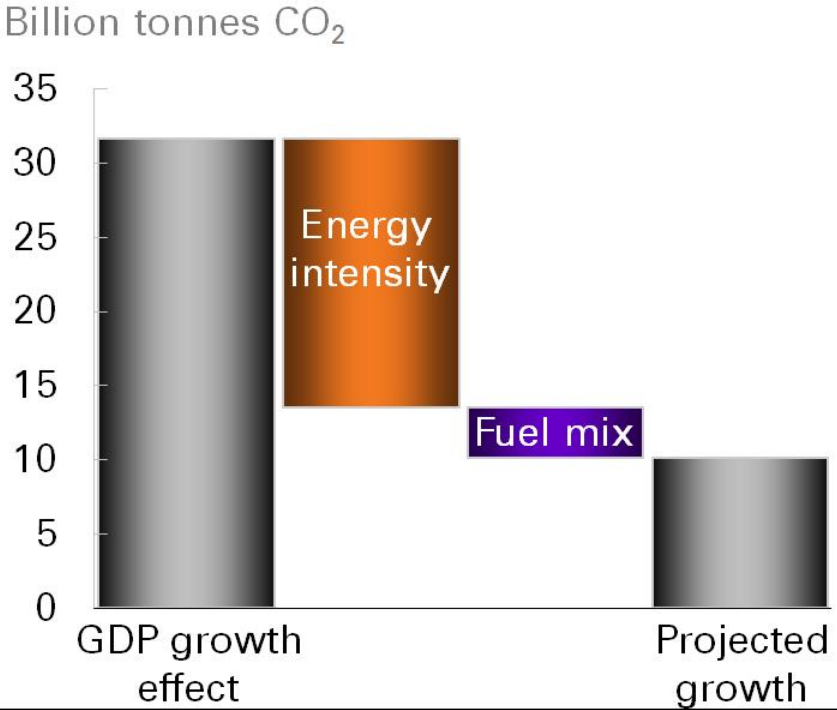


Energy efficiency and fuel mix restrain emissions growth

GDP, energy and emissions



Emissions growth 2012 to 2035



Conclusion

Meeting the global energy challenge



- Sufficient and available?
 - Yes – new energy sources and efficiency improvements
- Secure and reliable?
 - Mixed – improving for some, a concern for others
- Sustainable?
 - Room for improvement

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