

# BP Energy Outlook

2017 edition

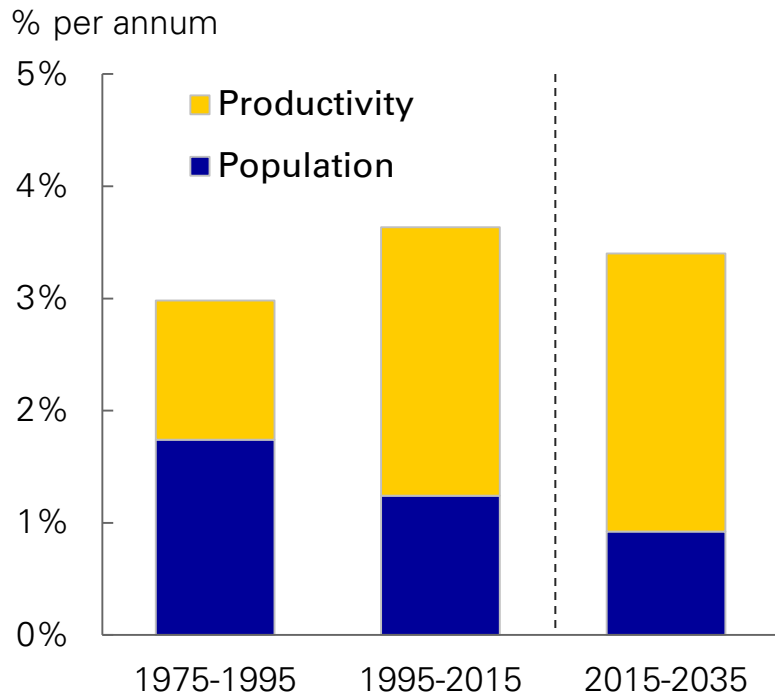


**Spencer Dale**  
Group chief economist

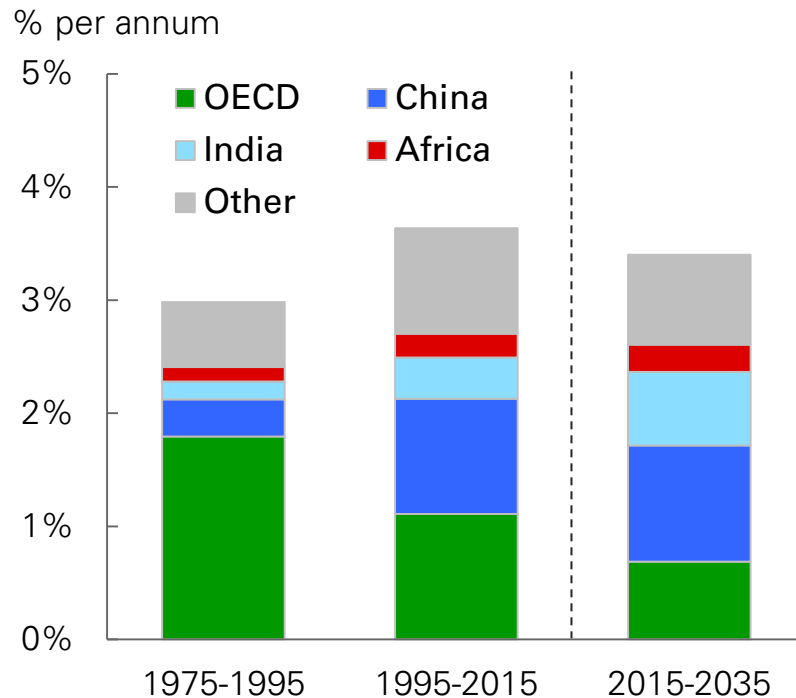
[bp.com/energyoutlook](http://bp.com/energyoutlook)  
#BPstats

# Economic backdrop

## Contributions to GDP growth by factor

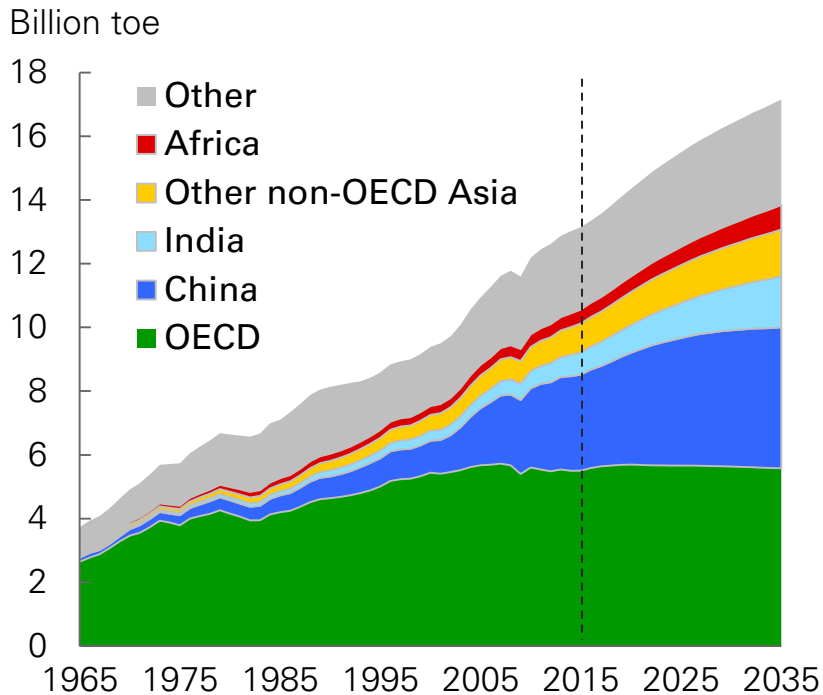


## Contributions to GDP growth by region

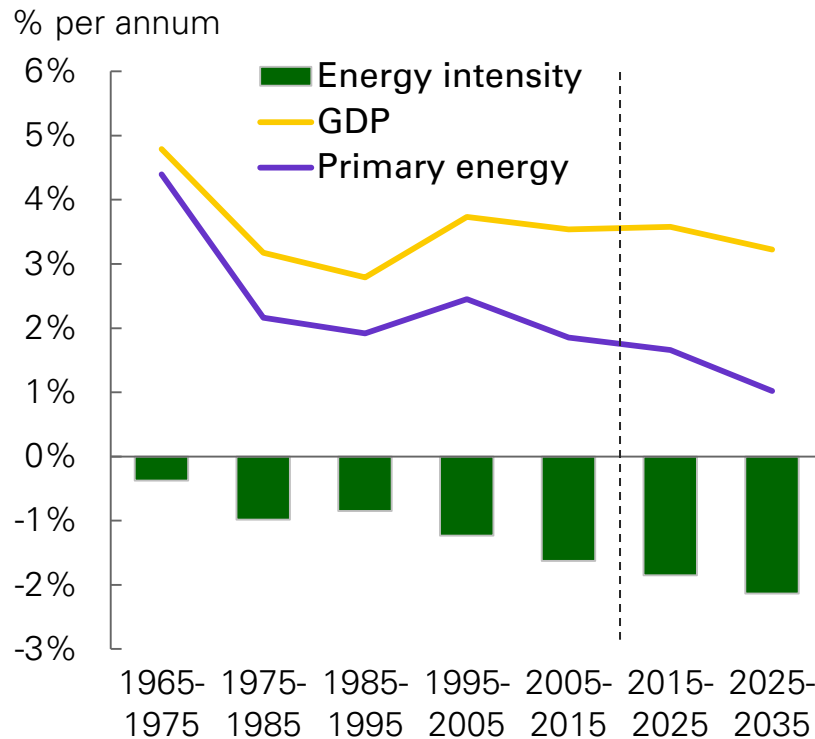


# Global energy demand

## Energy consumption by region



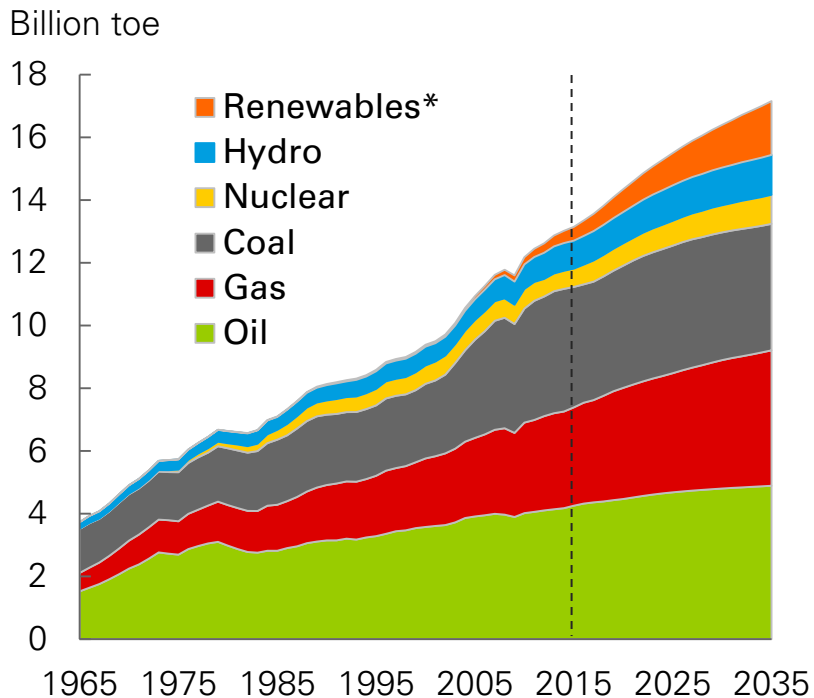
## Growth in GDP and primary energy



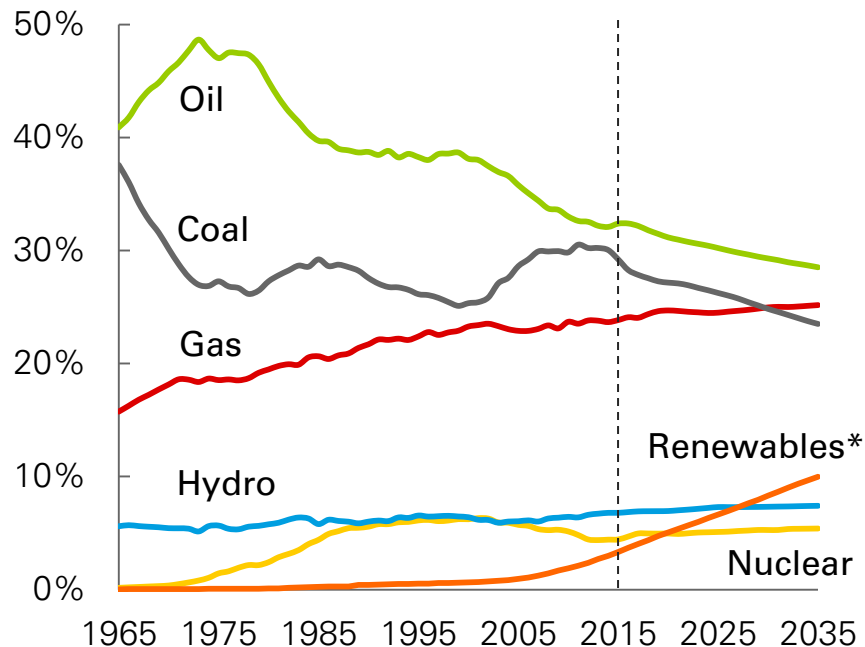
# Fuel mix



## Primary energy consumption by fuel



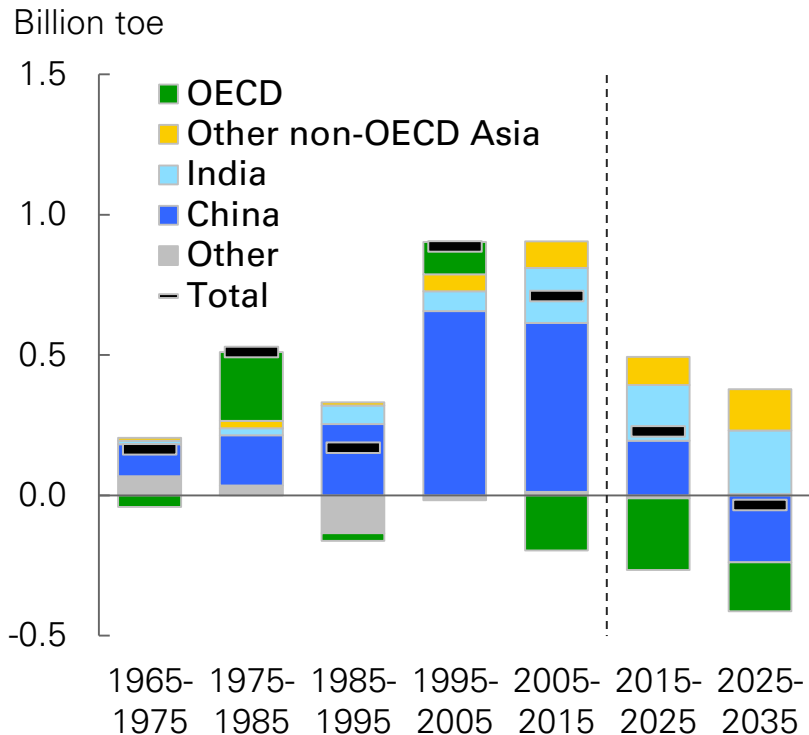
## Shares of primary energy



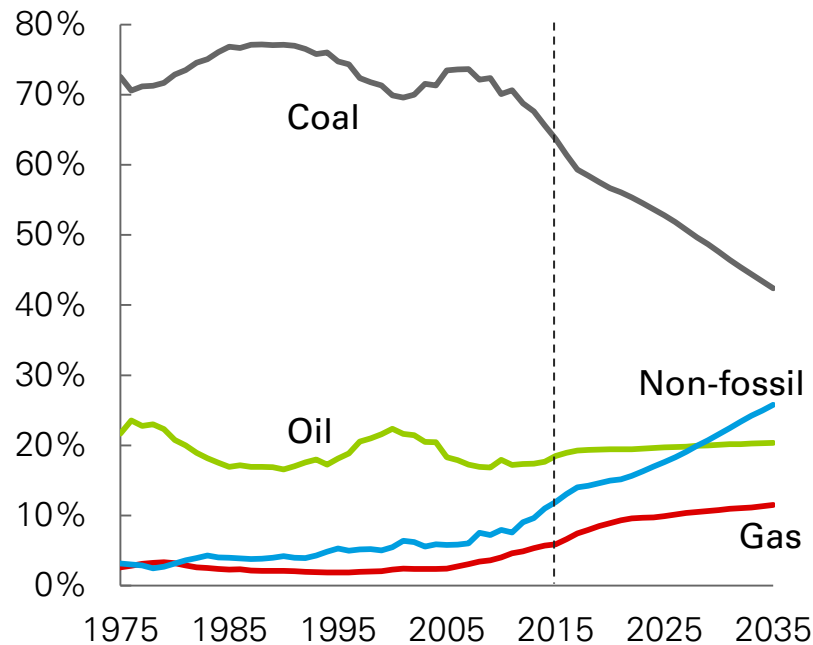
\*Renewables includes wind, solar, geothermal, biomass, and biofuels

# China's declining dependency on coal

## Coal consumption growth by region

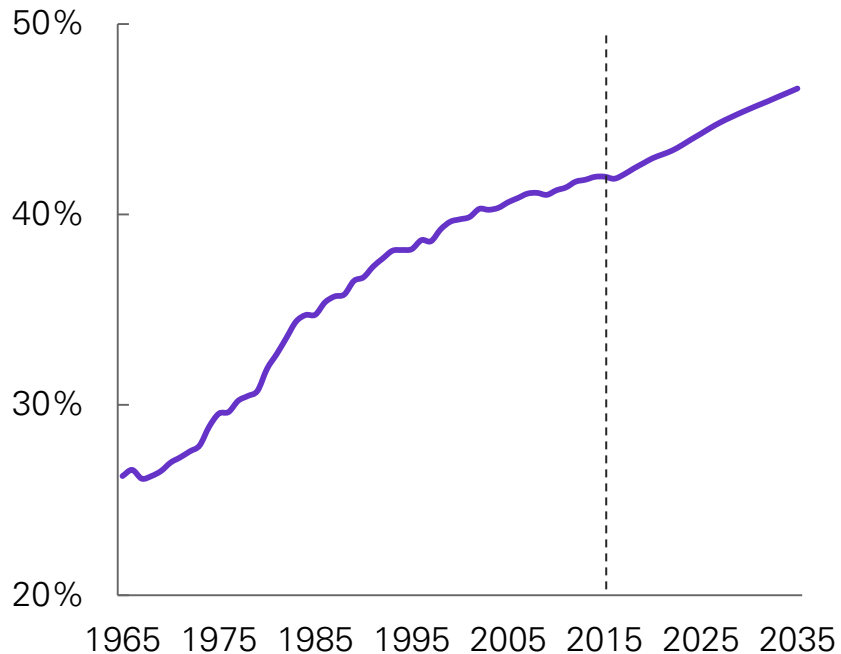


## Shares of primary energy in China

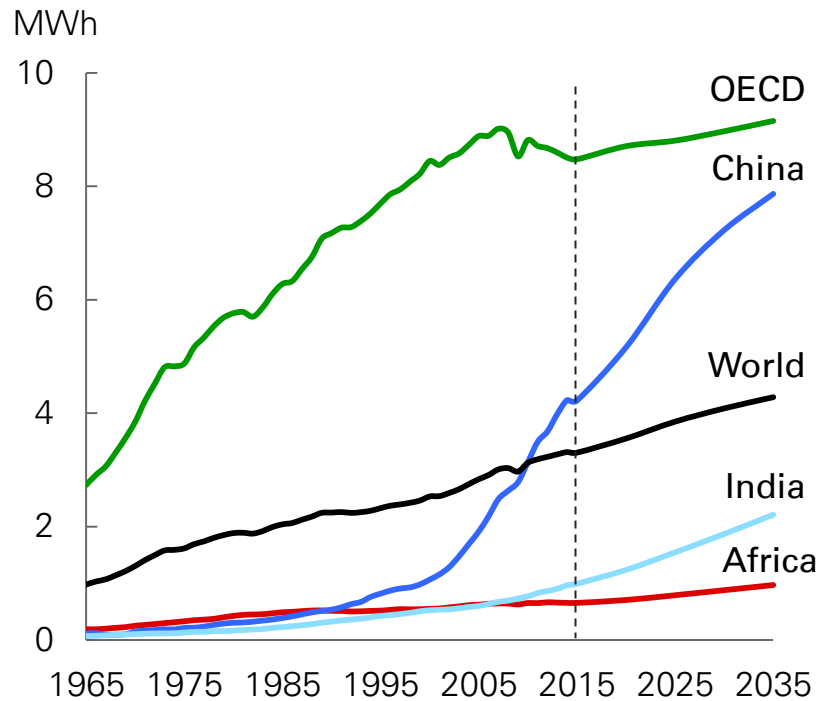


# Growth of the power sector

Power sector's share of primary energy consumption



Electricity consumption per capita



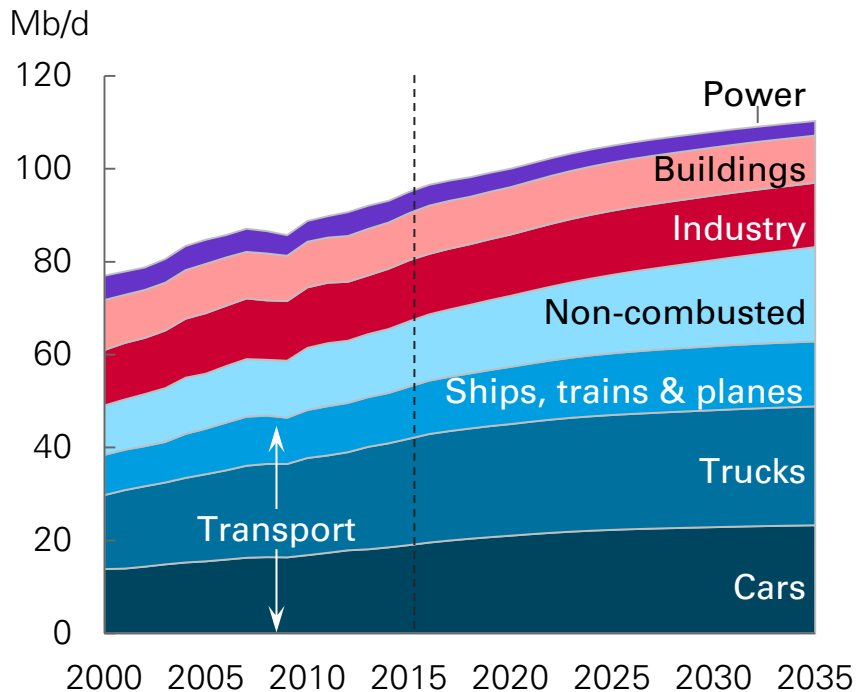
# Oil

- How might electric cars and the broader mobility revolution affect oil demand?
- How might the abundance of oil resources affect the behaviour of low-cost oil producers?

# Oil demand

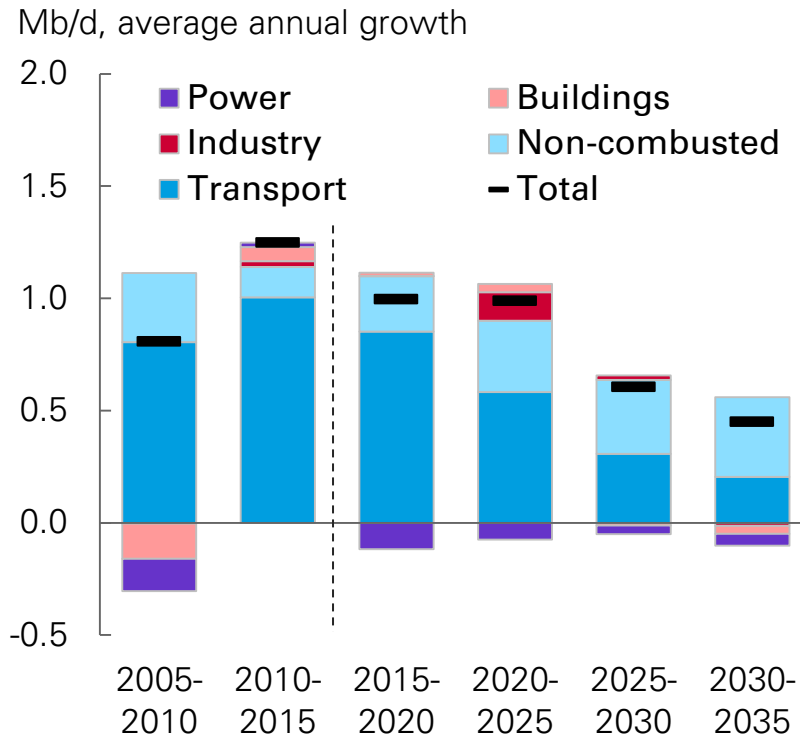


## Liquids demand



Liquids includes oil, biofuels and derivatives of coal and natural gas

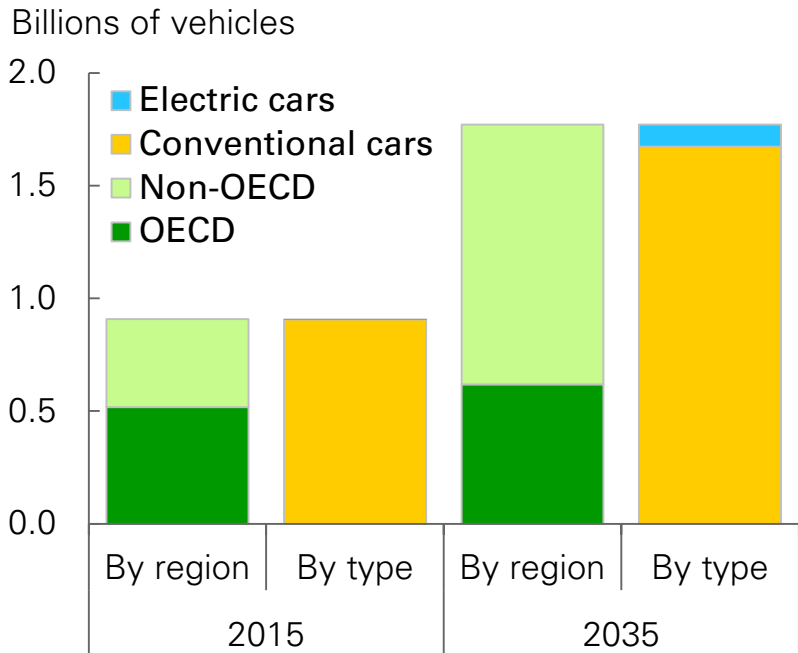
## Liquids demand growth



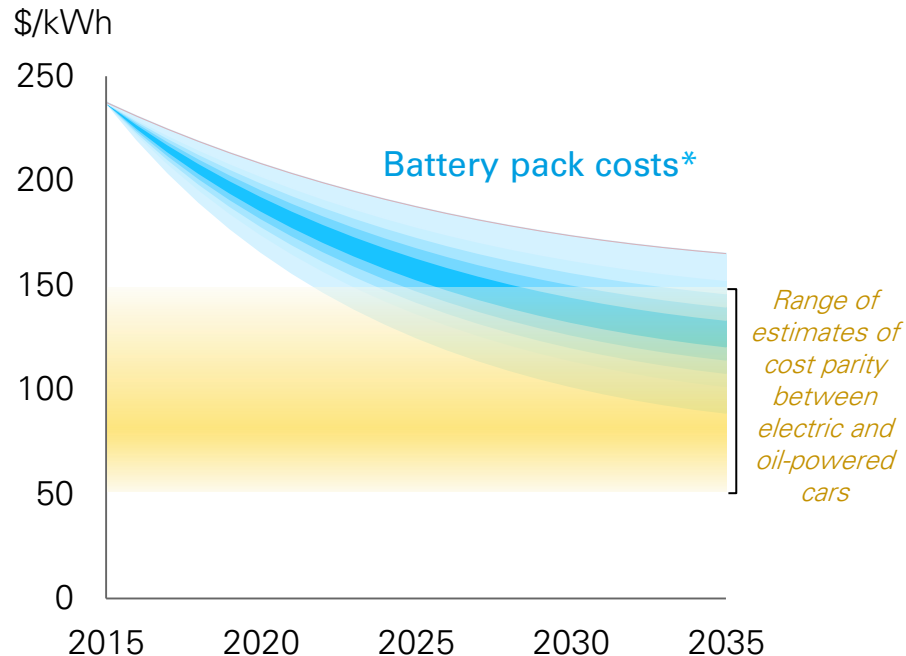


# Growth of electric cars

## The global car fleet: 2015-2035



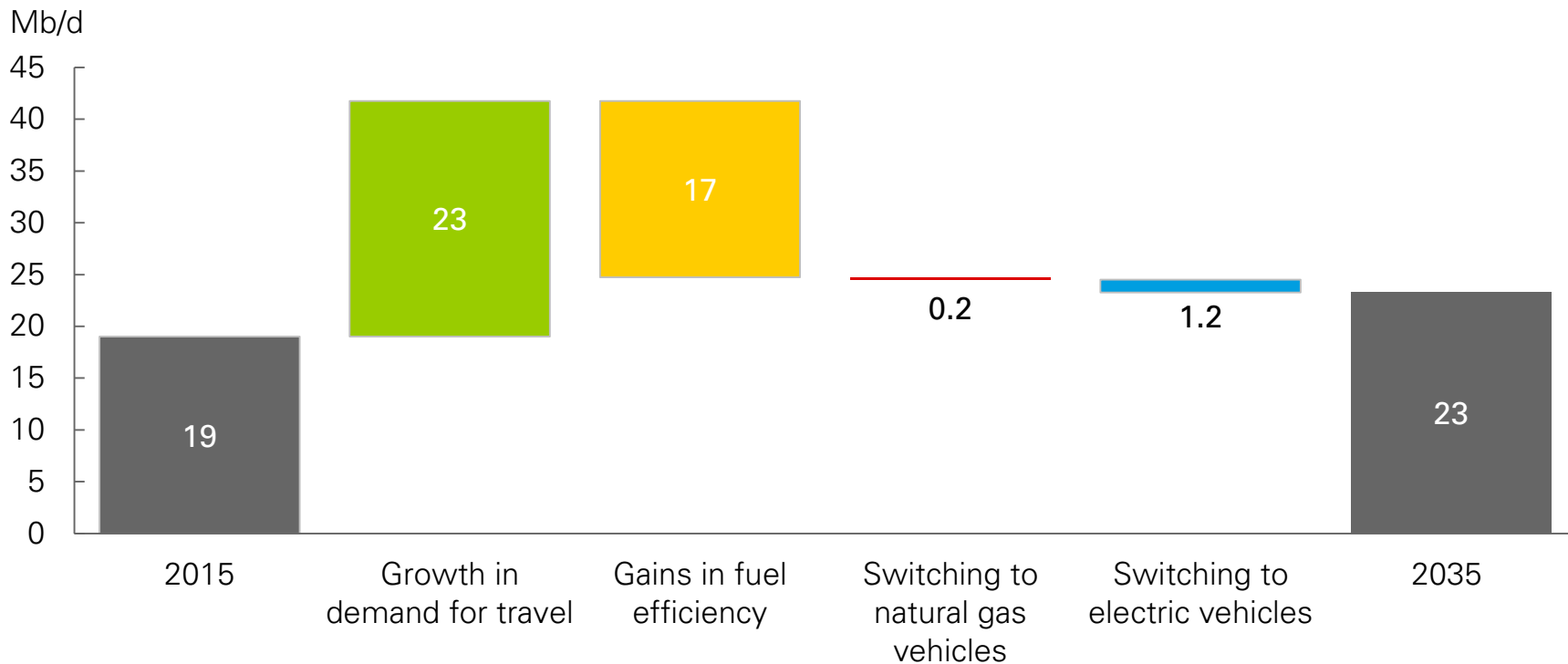
## Illustrative path for battery pack costs



\*For a Battery Electric Vehicle with a 60 kWh pack. Cost projections depend heavily on the degree of EV uptake, which is uncertain, so ranges should be treated as illustrative only. Current estimates of battery costs also vary widely, but this uncertainty is not shown

# Liquid fuel demand from cars

Decomposing changes in liquids demand from cars: 2015-2035



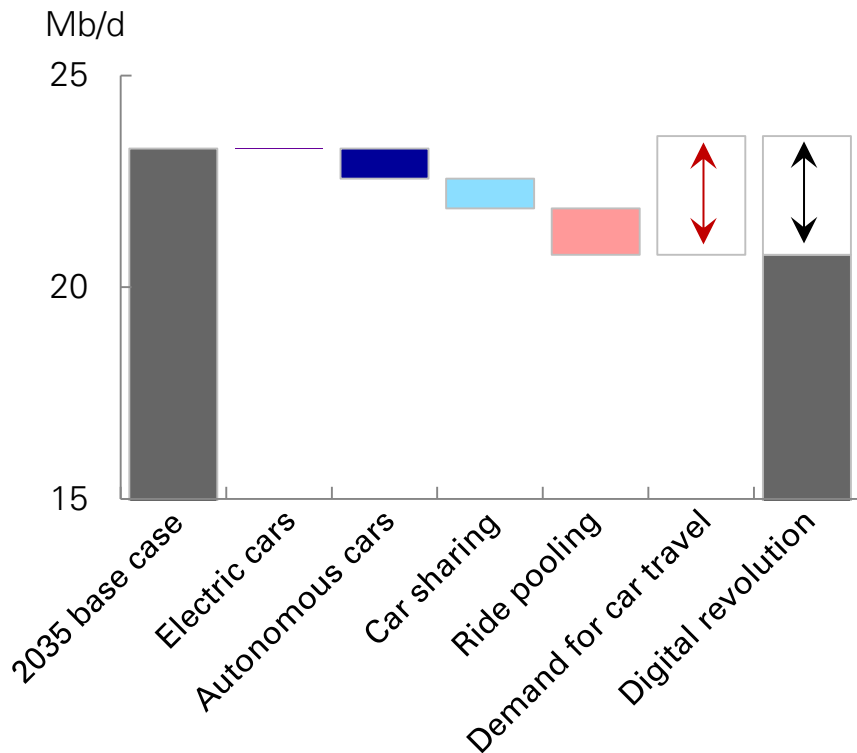
# Mobility revolution

- **Electric cars:** lead to a switch away from conventional cars
- **Autonomous vehicles:** improve fuel efficiency via efficient driving
- **Car sharing:** can amplify the effects of new-technology cars
- **Ride pooling:** reduce total miles driven by pooling journeys

# Mobility revolution scenarios

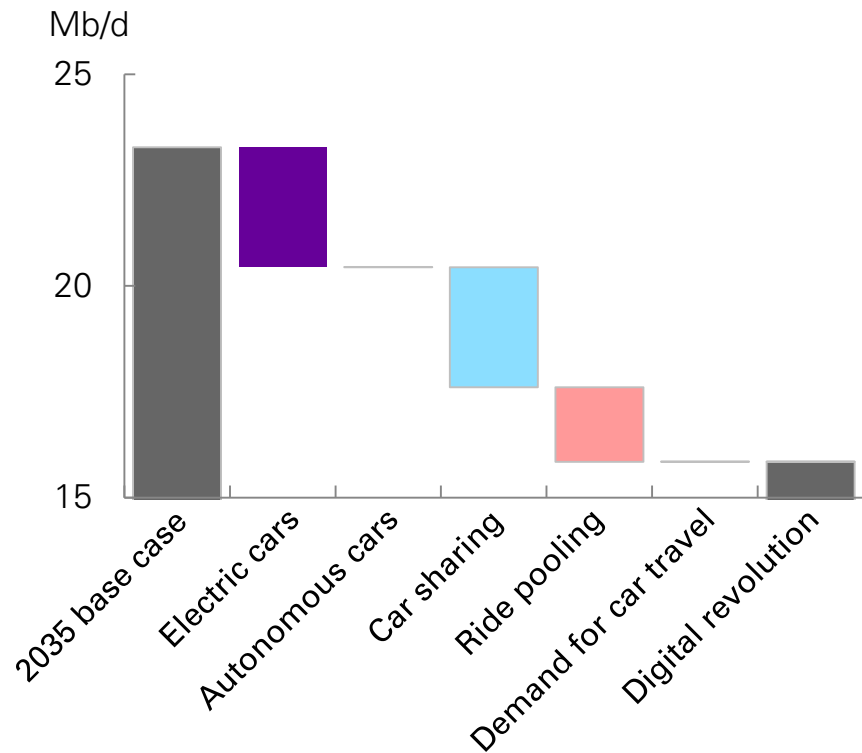
## Digital revolution:

### Impact on oil demand in cars in 2035



## Electric revolution:

### Impact on oil demand in cars in 2035



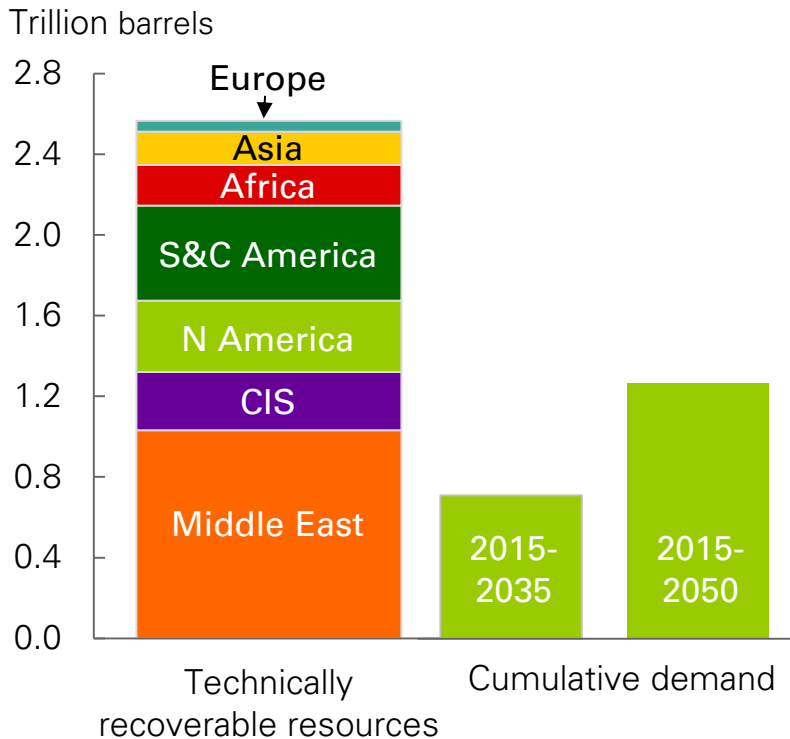
# Oil

- How might electric cars and the broader mobility revolution affect oil demand?
- How might the abundance of oil resources affect the behaviour of low-cost oil producers?

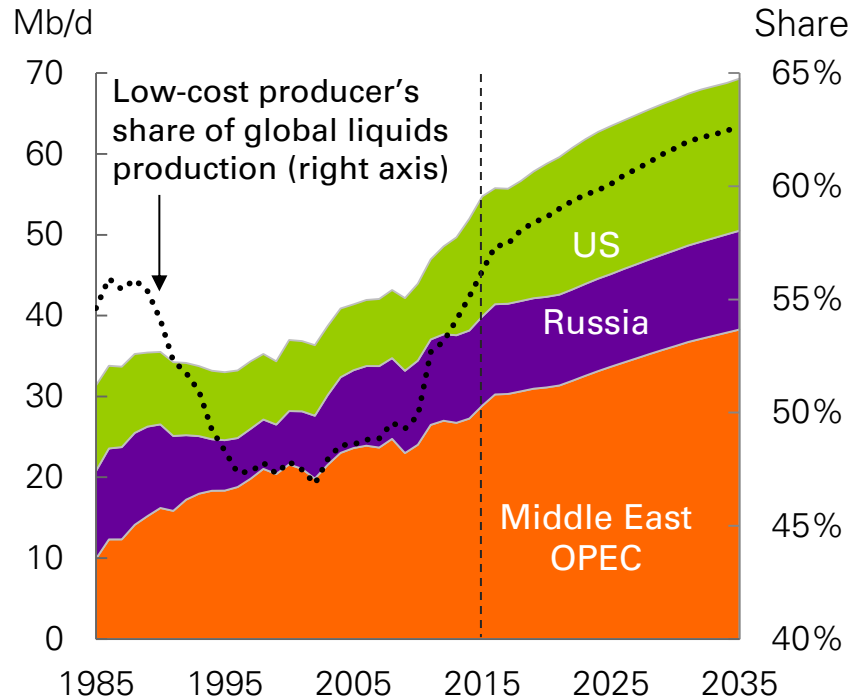


# Abundance of oil resources

## Estimates of technically recoverable resources and cumulative oil demand



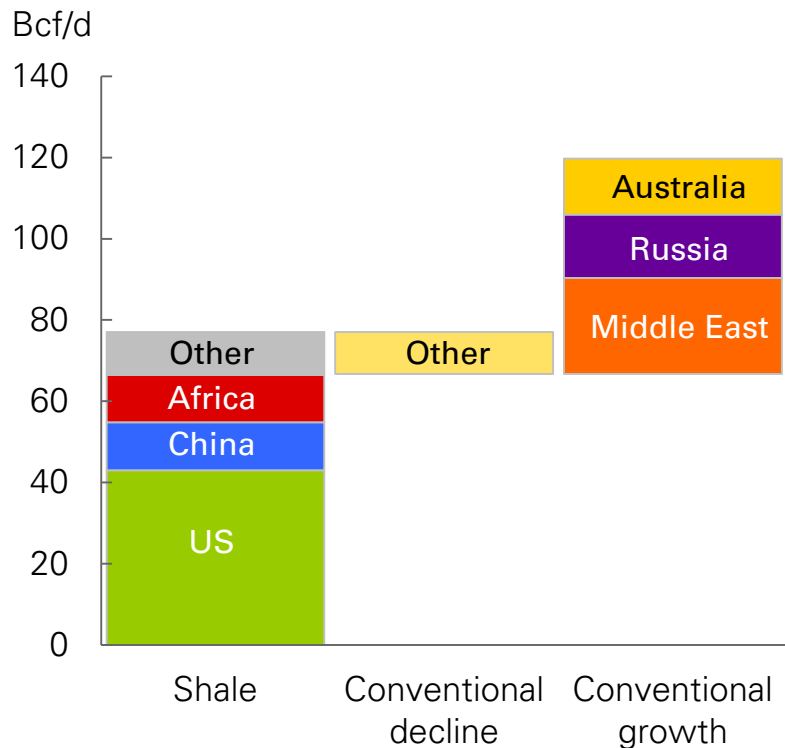
## Oil supply of lower-cost producers



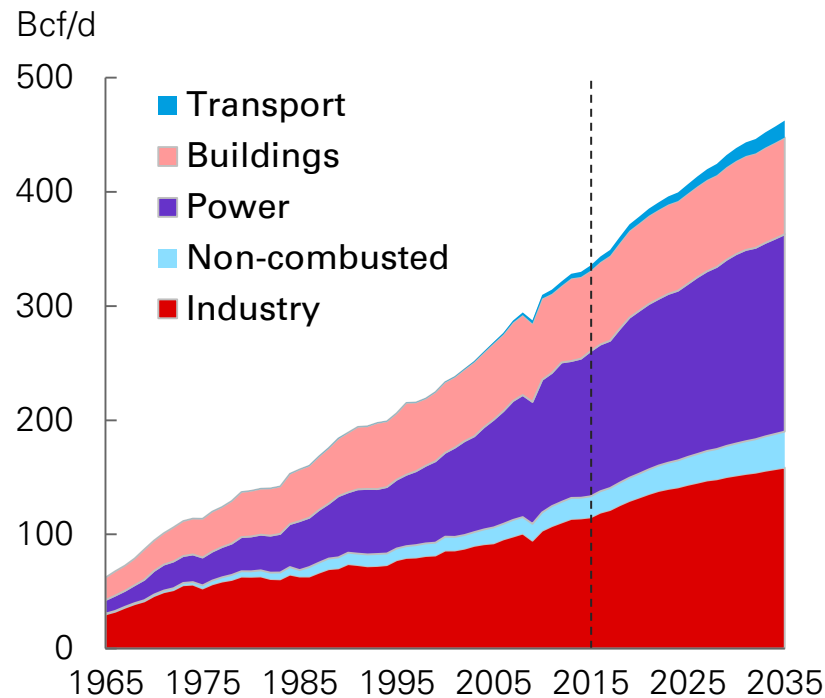
# Natural gas



## Gas supply growth: 2015-2035



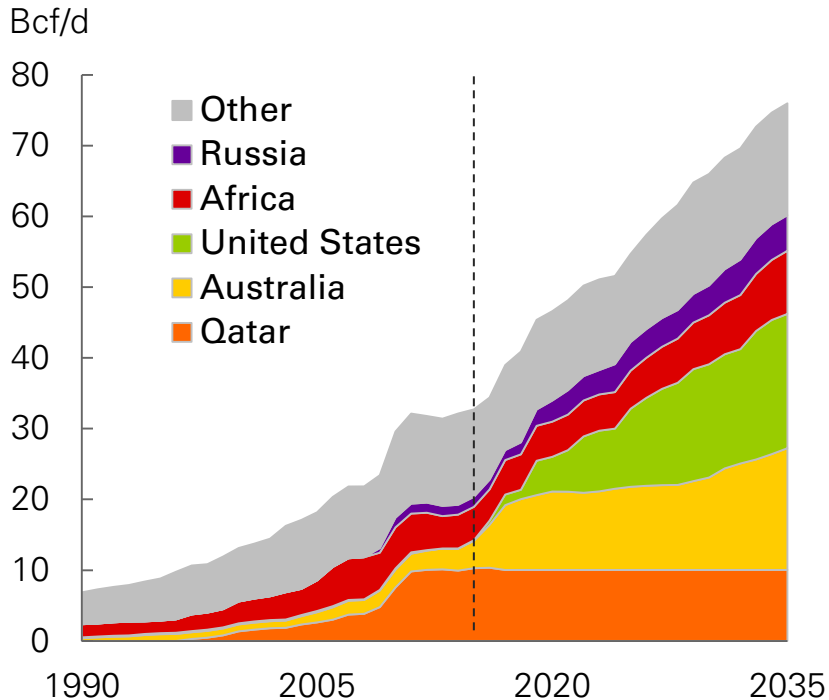
## Gas consumption by sector



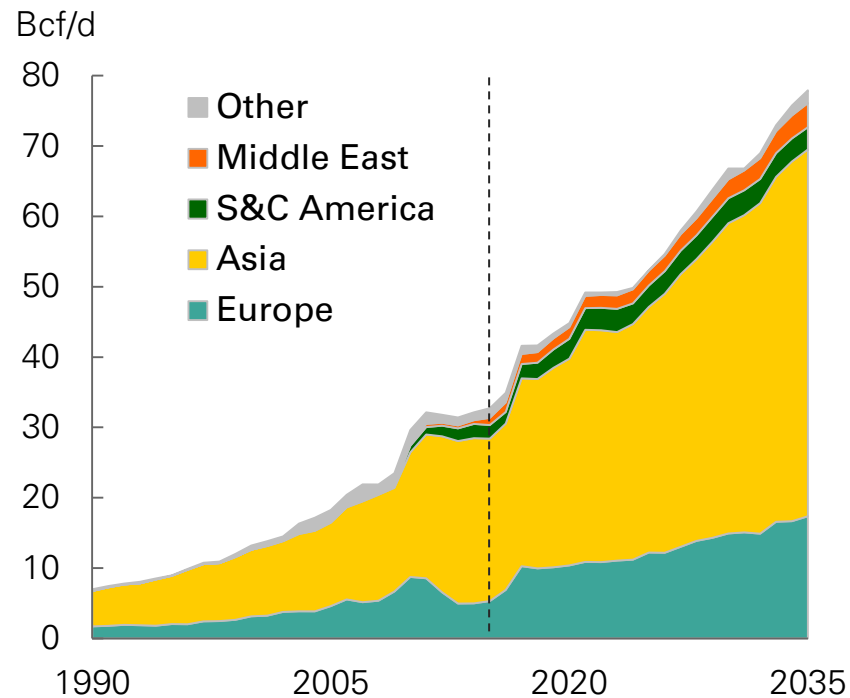
# Growth of LNG



## LNG supply



## LNG demand

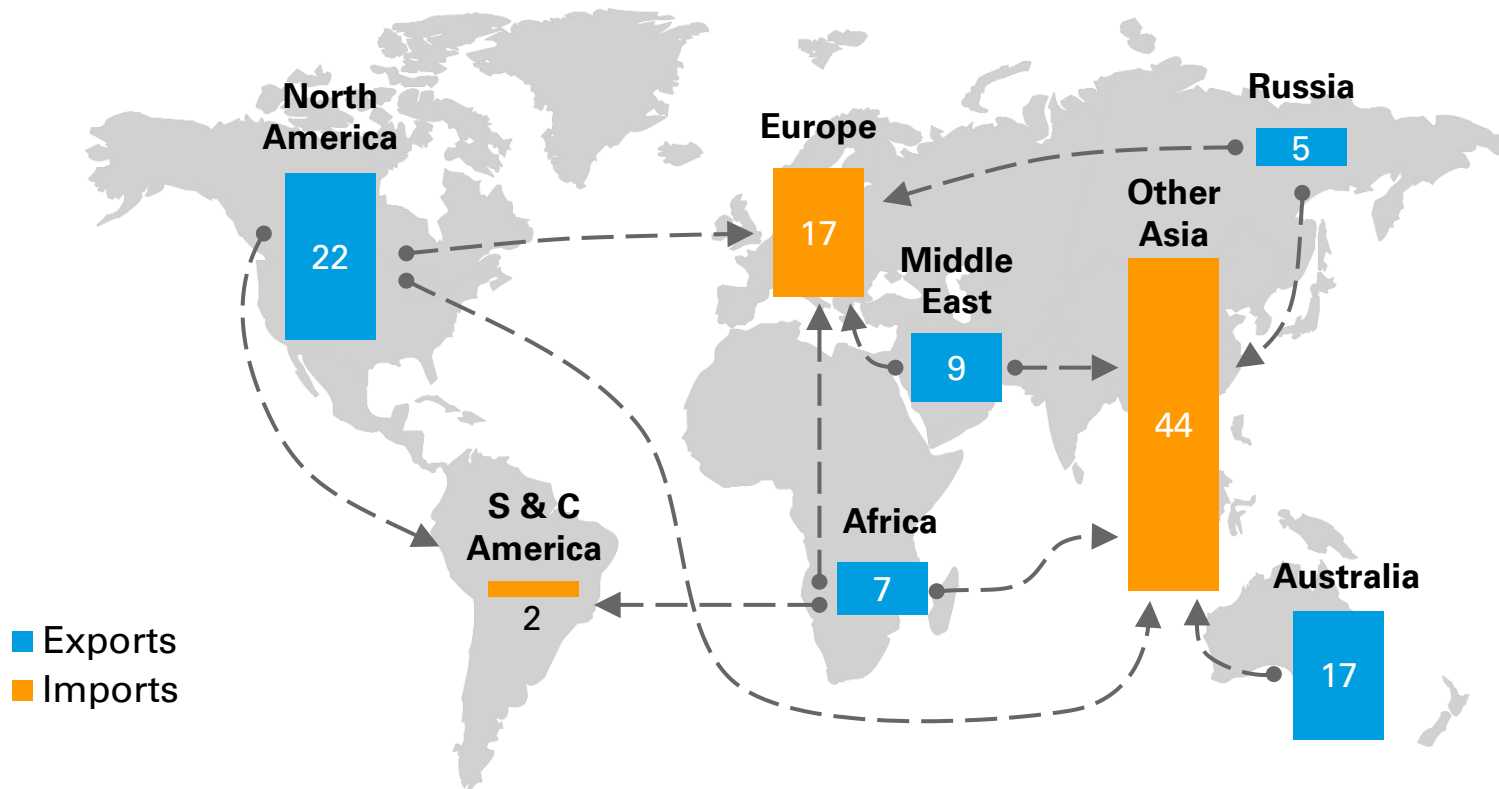




# LNG Trade



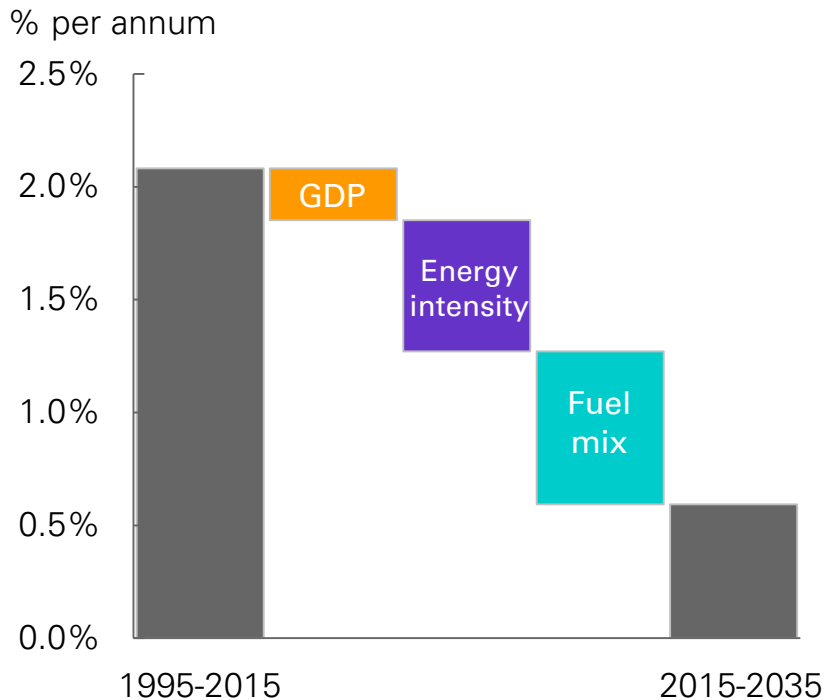
Net LNG exports and imports in 2035 (Bcf/d)



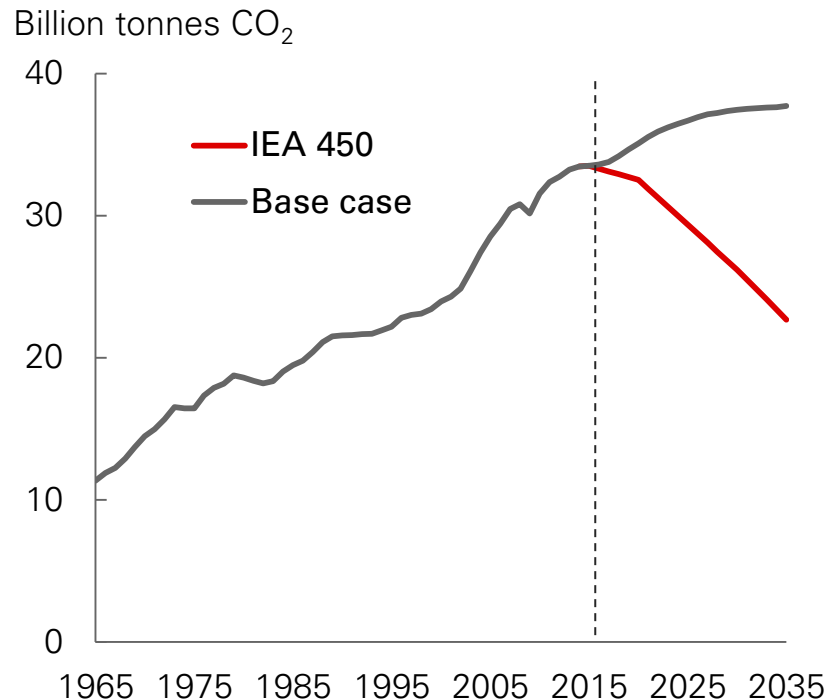
# Carbon emissions

# Carbon emissions

## Contributions to slower growth of carbon emissions

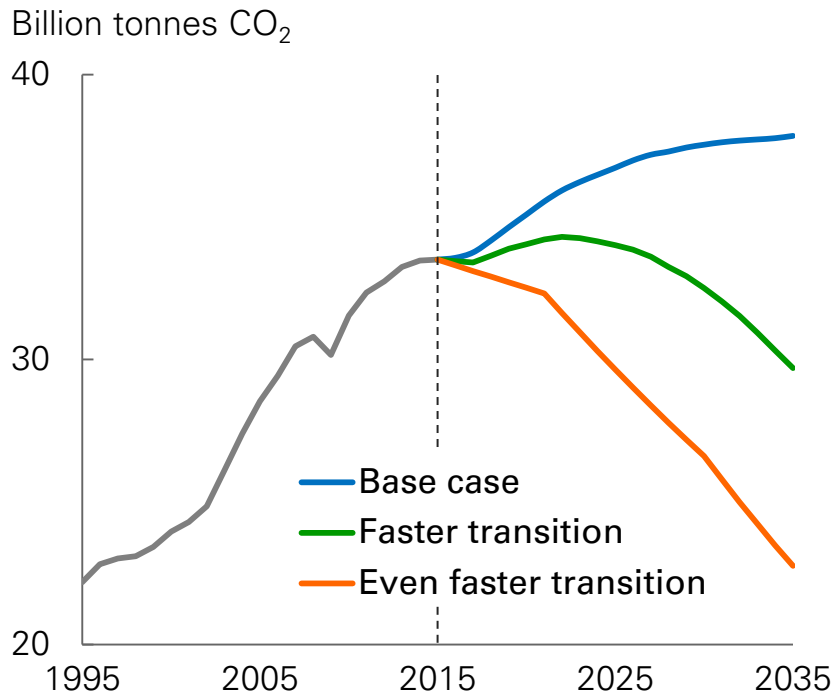


## Carbon emissions

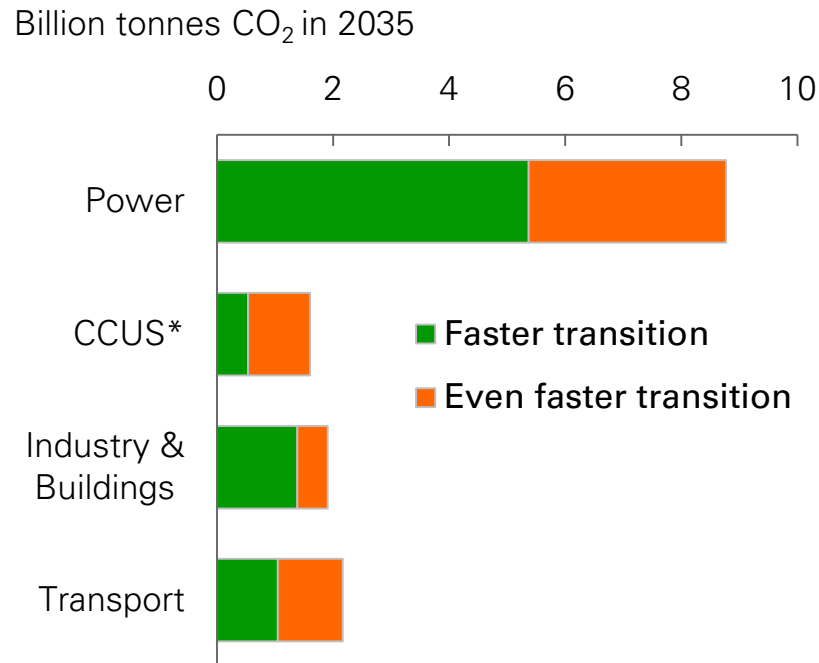


# Faster transition pathways

## Carbon emissions



## Reductions in emissions versus base case

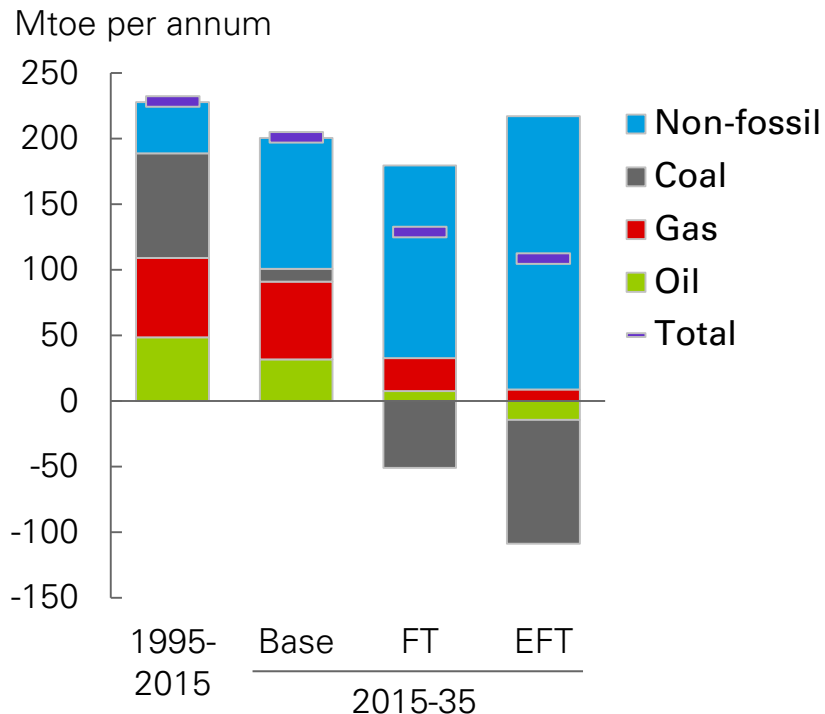


\*Carbon capture, use and storage (predominantly in power sector)

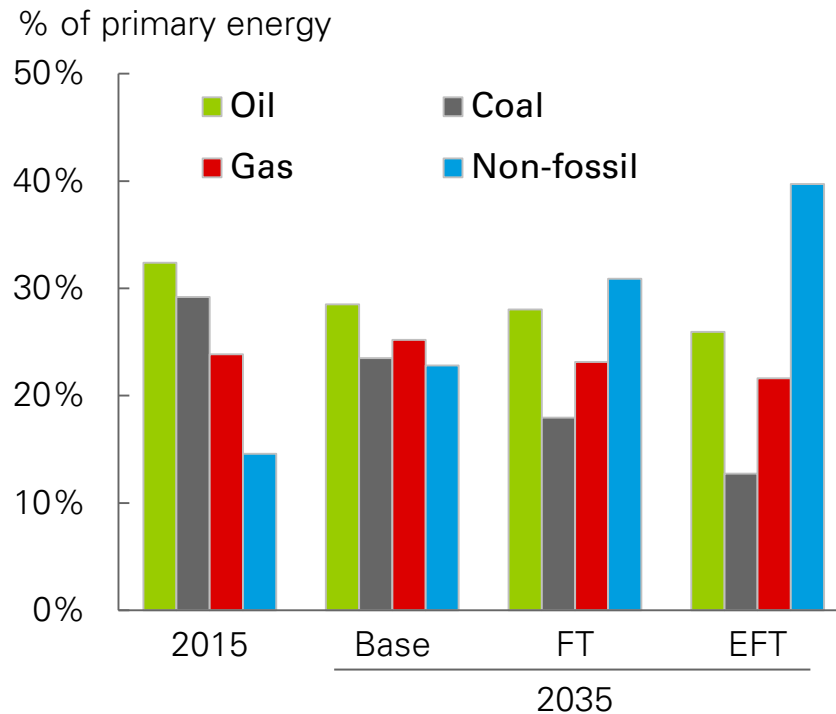
# Energy outlook under alternative transition pathways



## Annual demand growth by fuel



## The changing fuel mix

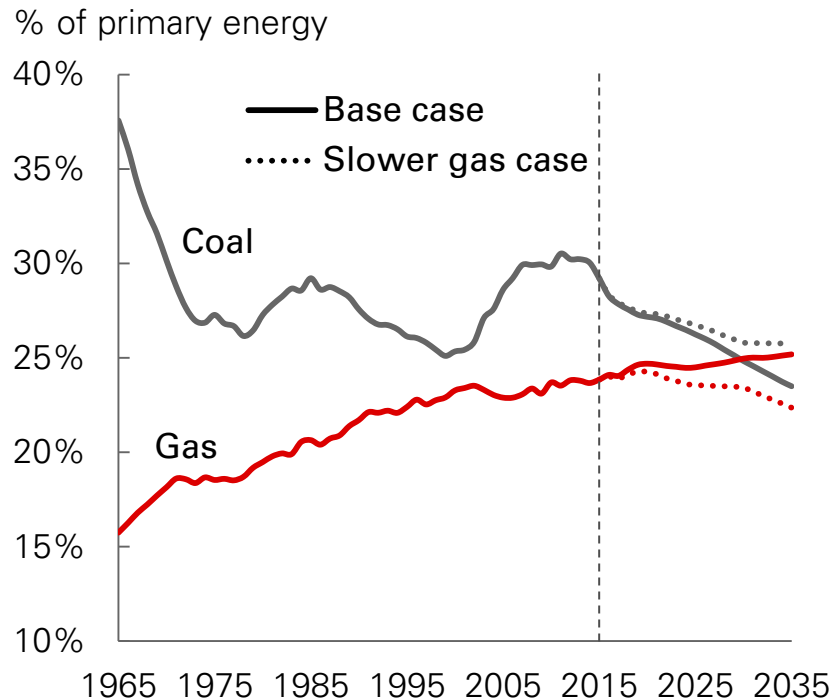


# Comparison with other low carbon scenarios

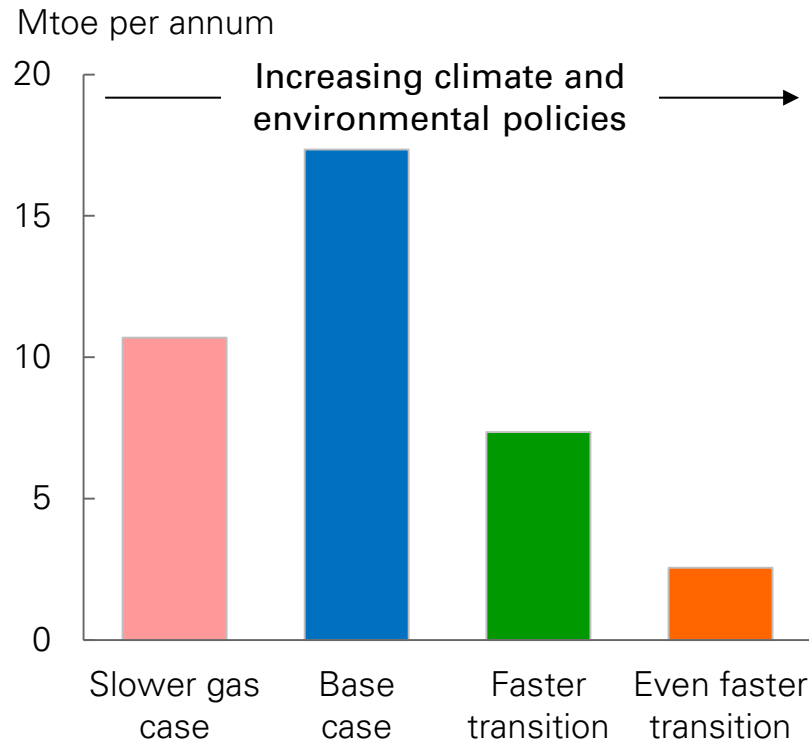
	Faster transition	Even faster transition	IEA 450	MIT 2° Base	IHS Markit 'Solar Efficiency'	Greenpeace 'Revolution'
Growth rate (% p.a.) 2015-35						
Carbon emissions	-0.7%	-2.0%	-2.0%	-2.0%	-2.8%	-3.2%
Total energy	0.9%	0.8%	0.4%	0.5%	-0.7%	-0.1%
Energy intensity	-2.4%	-2.5%	-3.0%	-2.9%	-4.0%	-3.5%
Carbon intensity	-1.5%	-2.7%	-2.3%	-2.5%	-2.1%	-3.5%
Share of total energy, 2035						
Oil & gas	51%	48%	48%	46%	51%	39%
Renewables	16%	23%	17%	29%	19%	38%
Share of abatement vs 2015						
Power sector	>100%	89%	77%	74%	58%	35%

# Risks to gas demand

## Global primary energy shares



## Natural gas growth 2015-2035



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