BP Energy Outlook
2017 edition

Spencer Dale
Group chief economist

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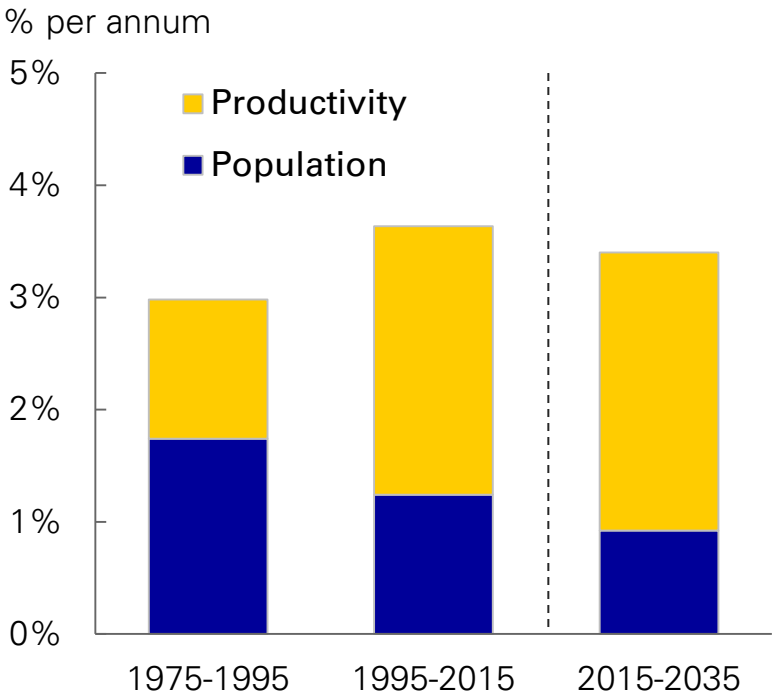
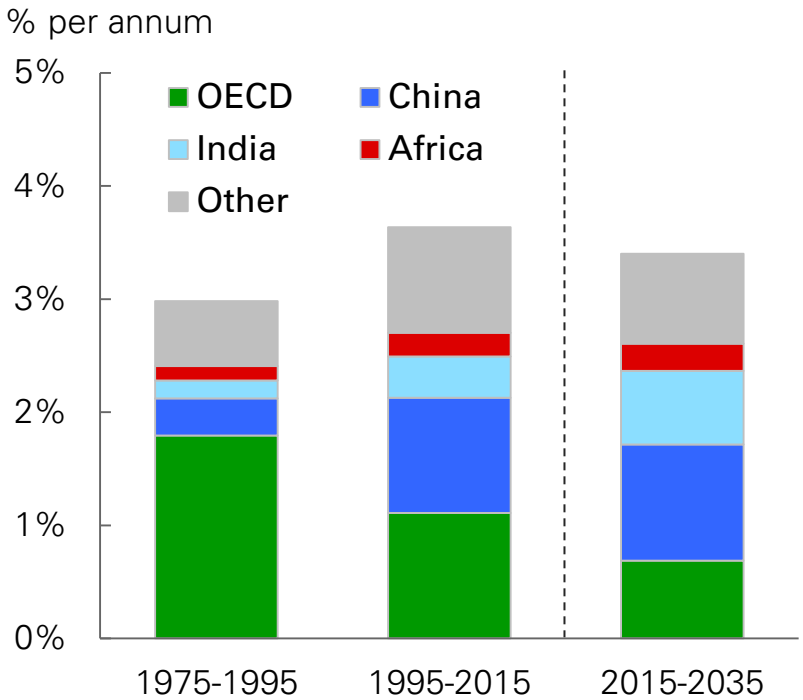
Economic backdrop

Contributions to GDP growth by factor



Contributions to GDP growth by region



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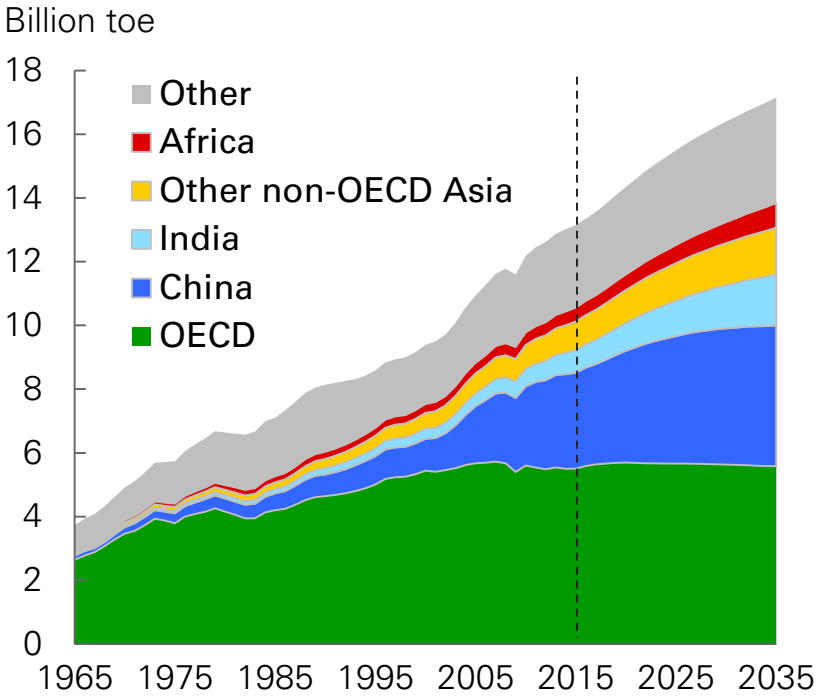
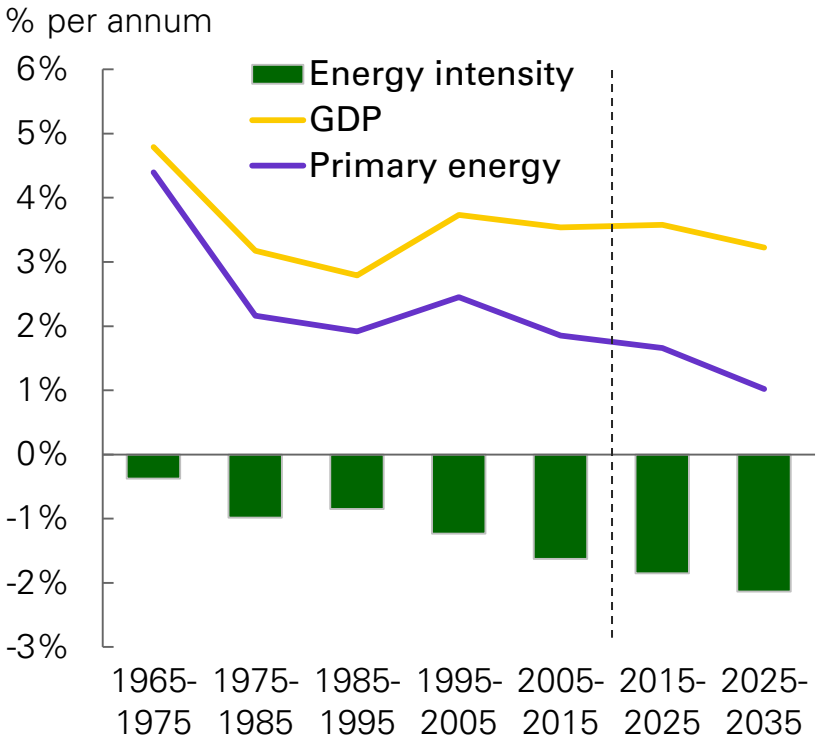
Global energy demand

Energy consumption by region



Growth in GDP and primary energy



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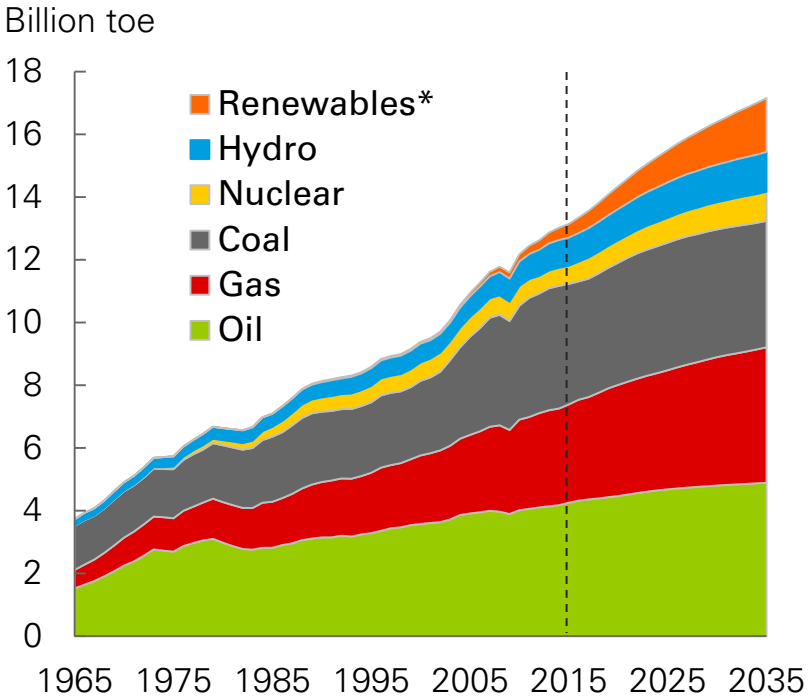
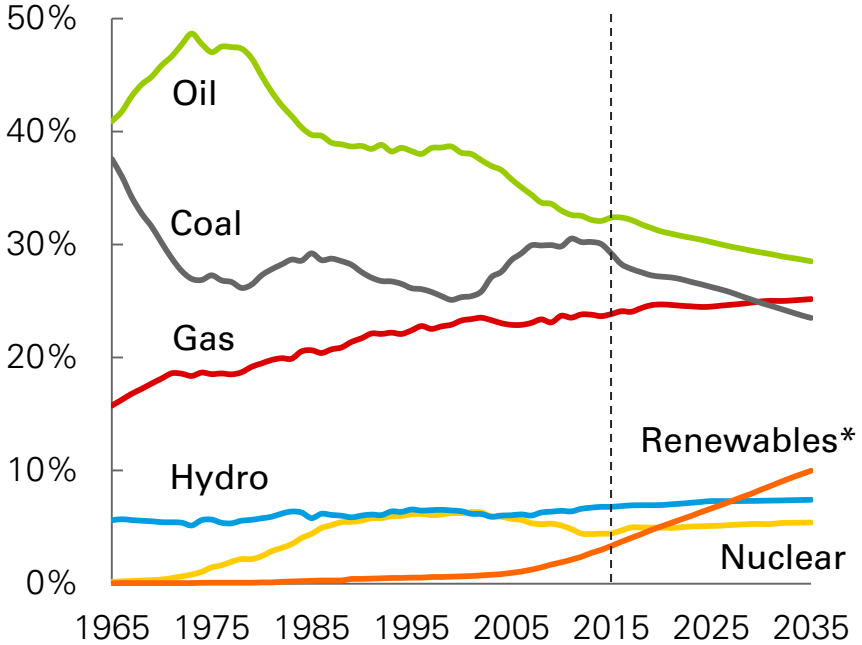
Fuel mix

Primary energy consumption by fuel



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

Shares of primary energy



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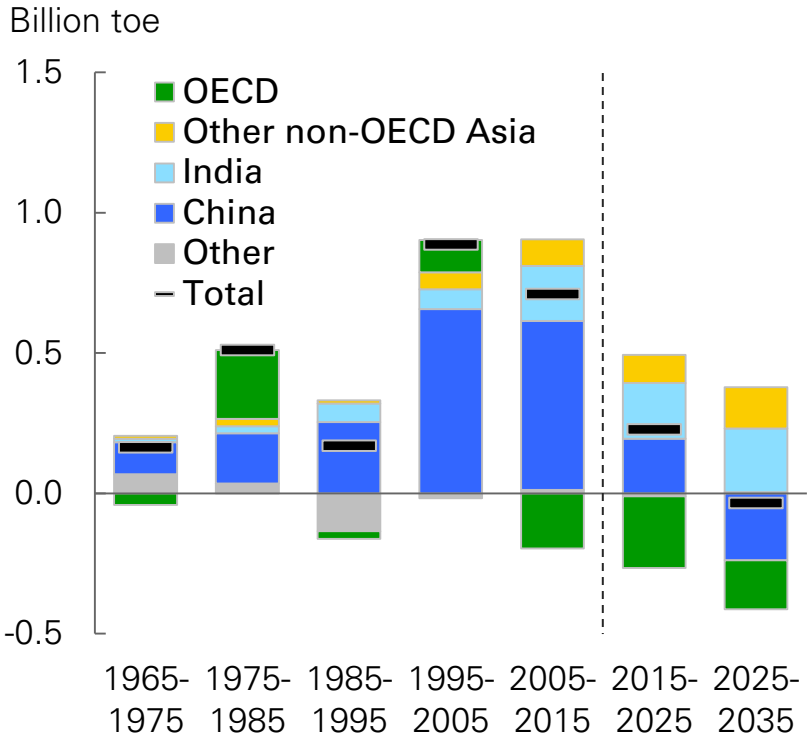
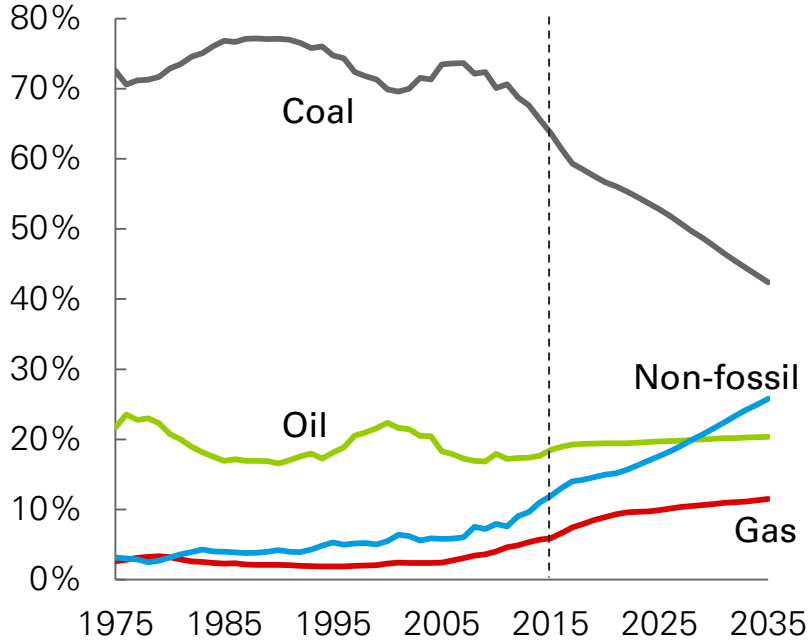
China's declining dependency on coal

Coal consumption growth by region



Shares of primary energy in China



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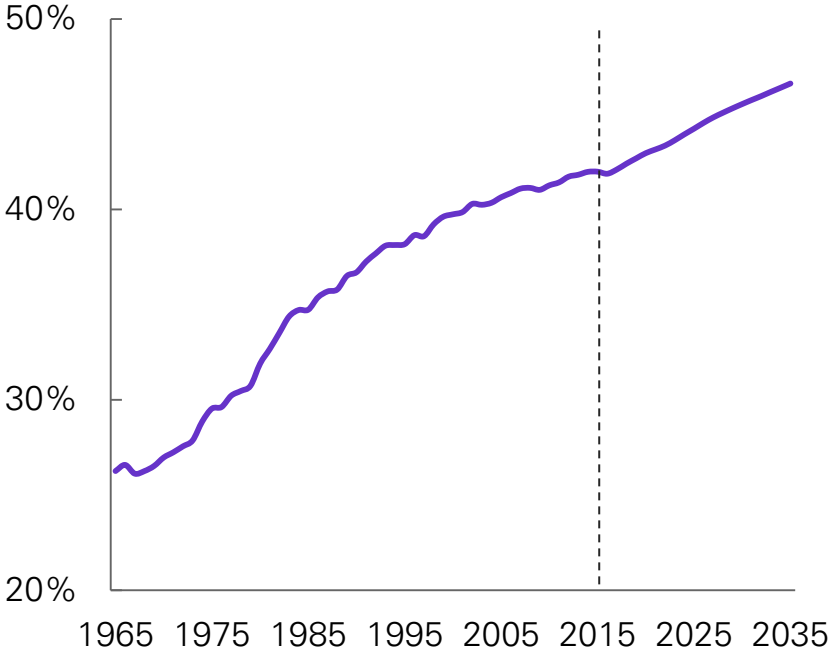
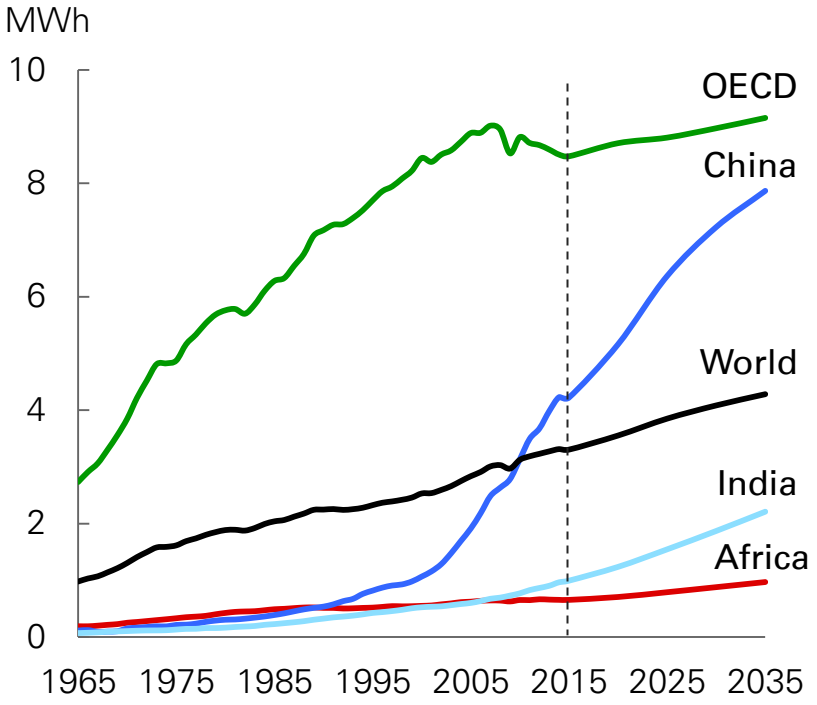
Growth of the power sector

Power sector's share of primary energy consumption



Electricity consumption per capita



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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?

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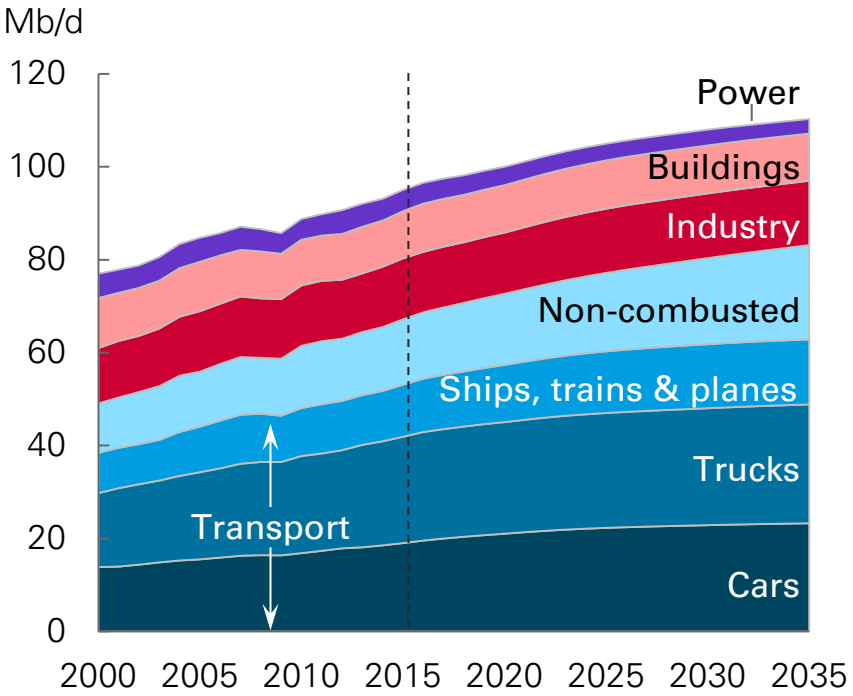
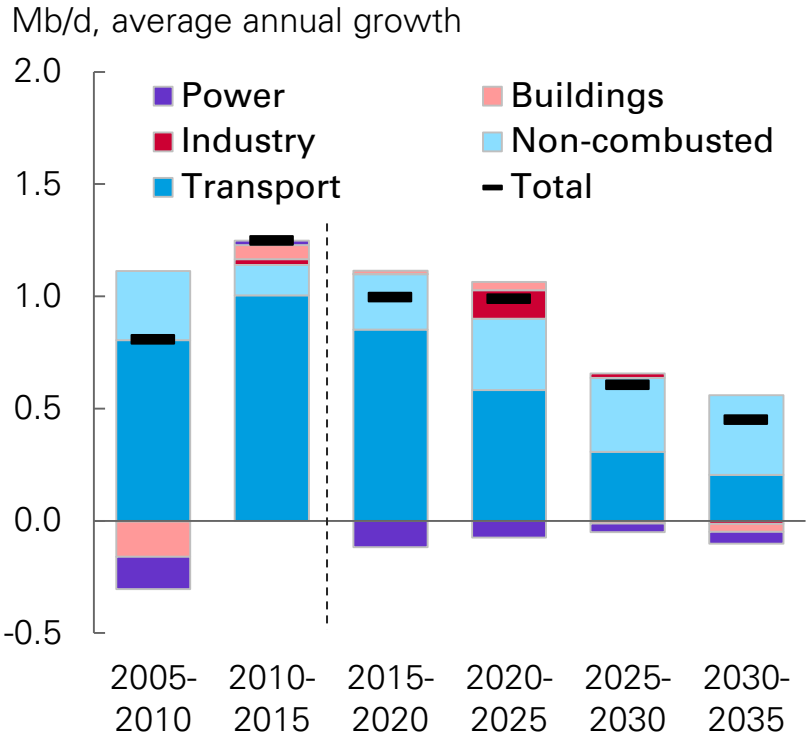
Oil demand

Liquids demand



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

Liquids demand growth



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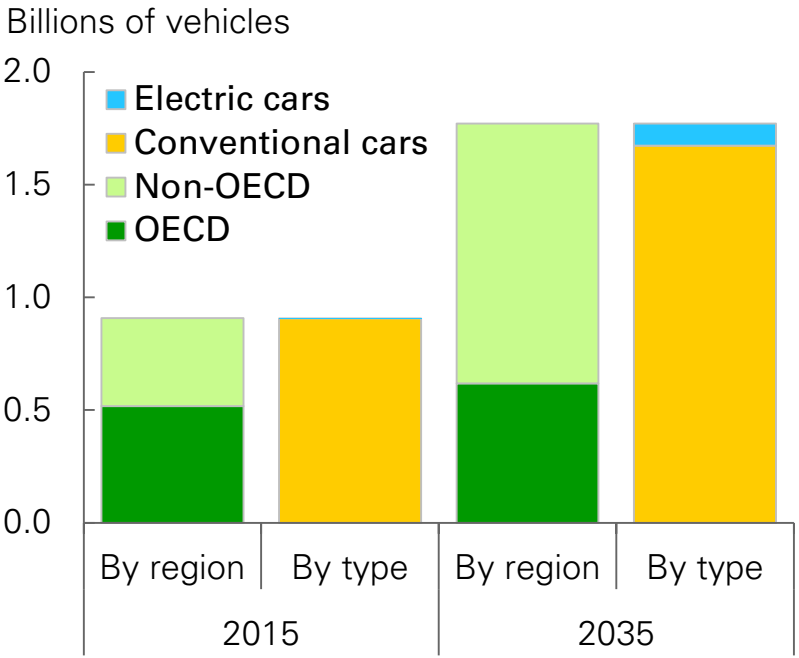
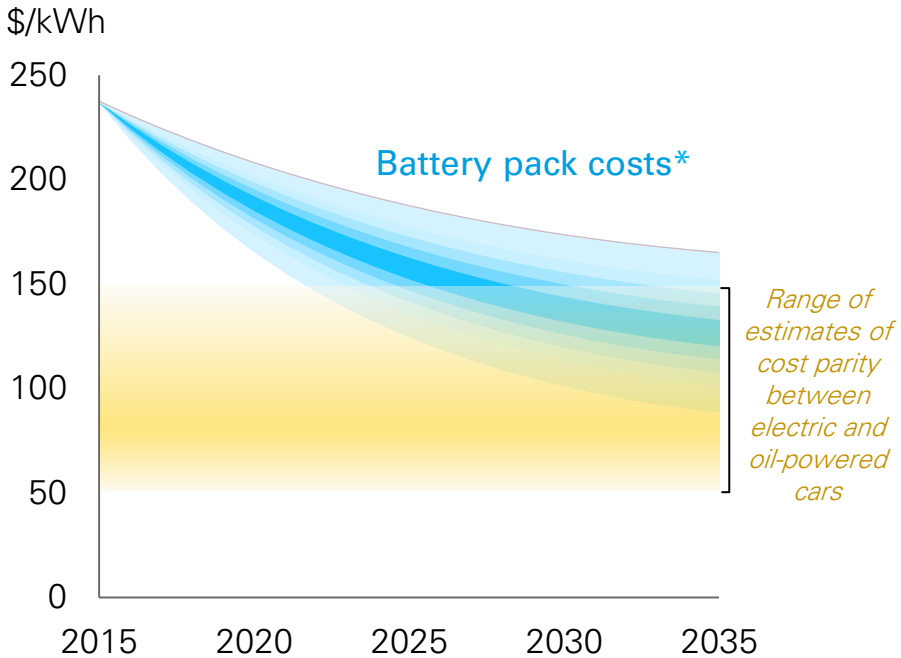
Growth of electric cars

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

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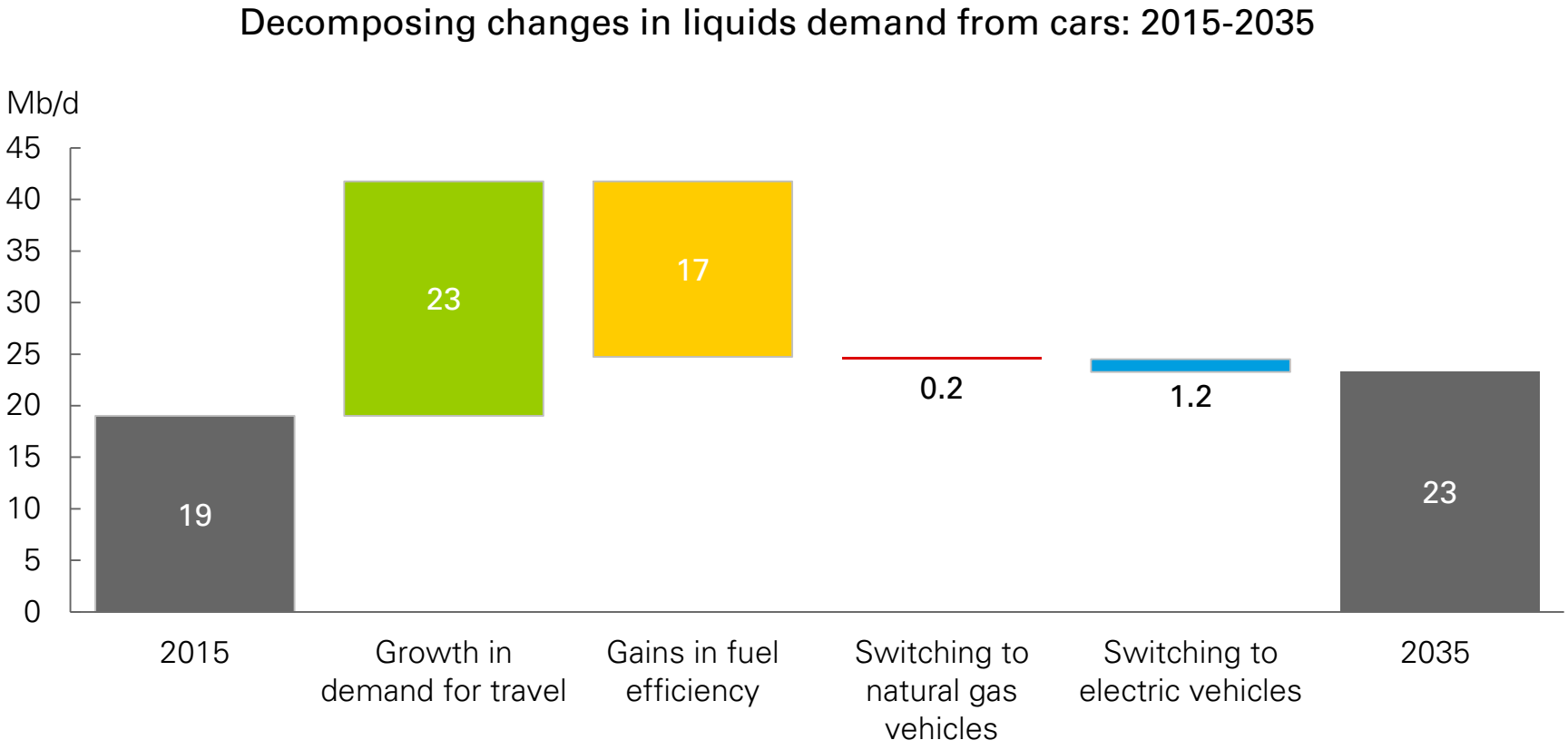
Liquid fuel demand from cars



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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

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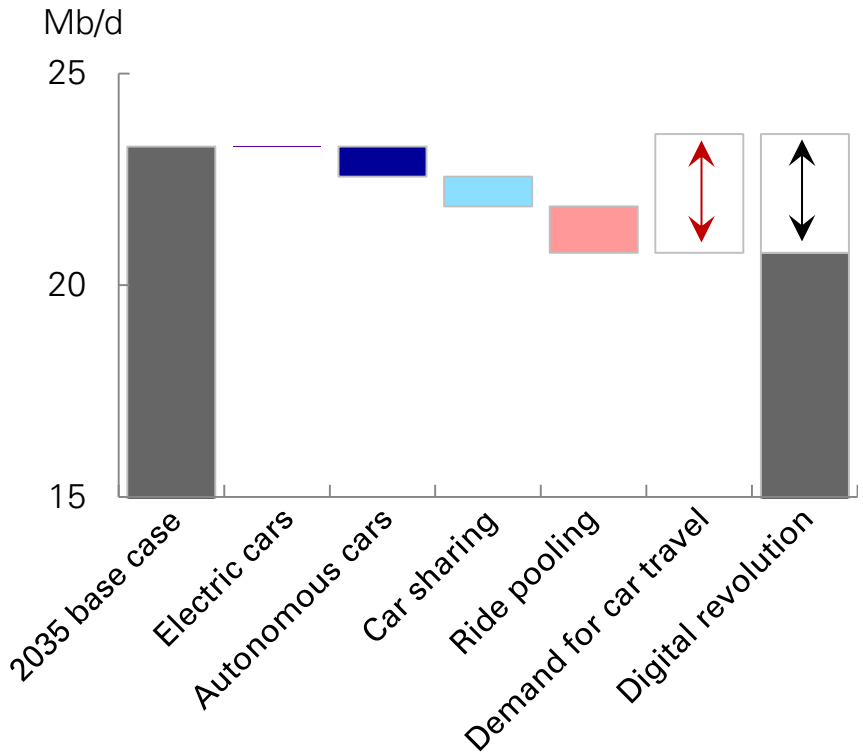
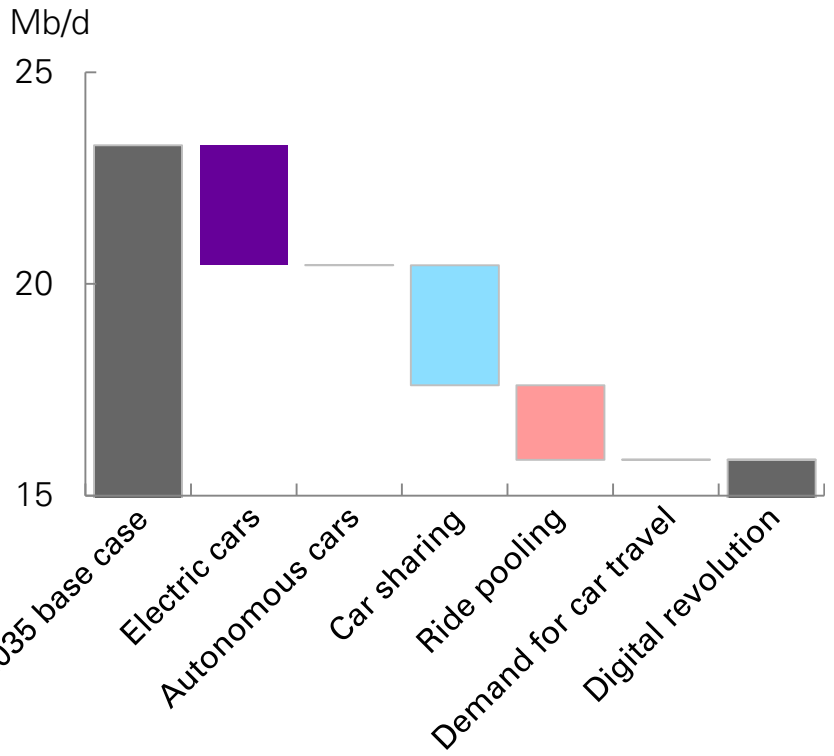
Mobility revolution scenarios

Digital revolution:
Impact on oil demand in cars in 2035



Electric revolution:
Impact on oil demand in cars in 2035



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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?

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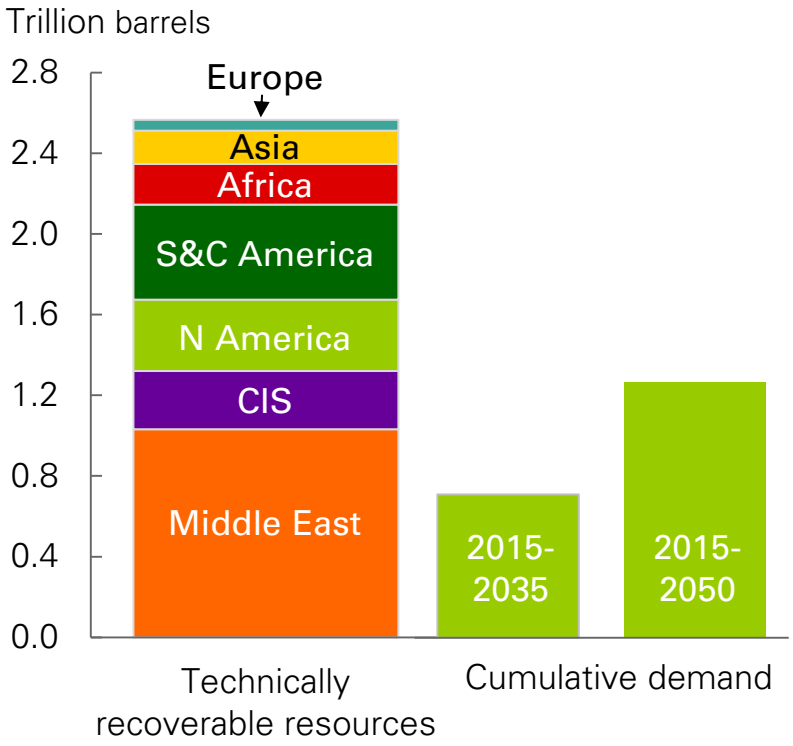
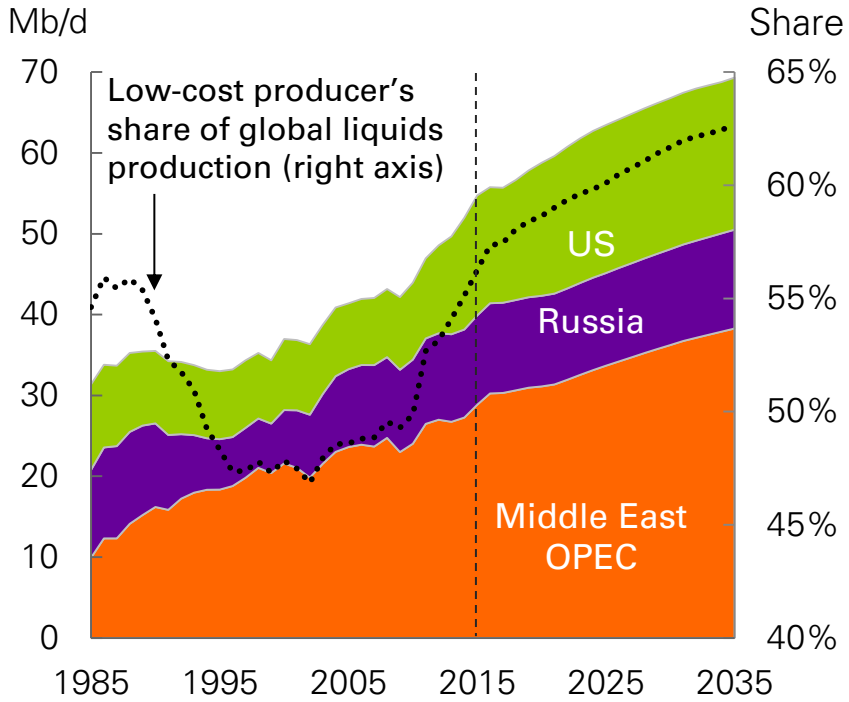
Abundance of oil resources

Estimates of technically recoverable resources and cumulative oil demand



Oil supply of lower-cost producers



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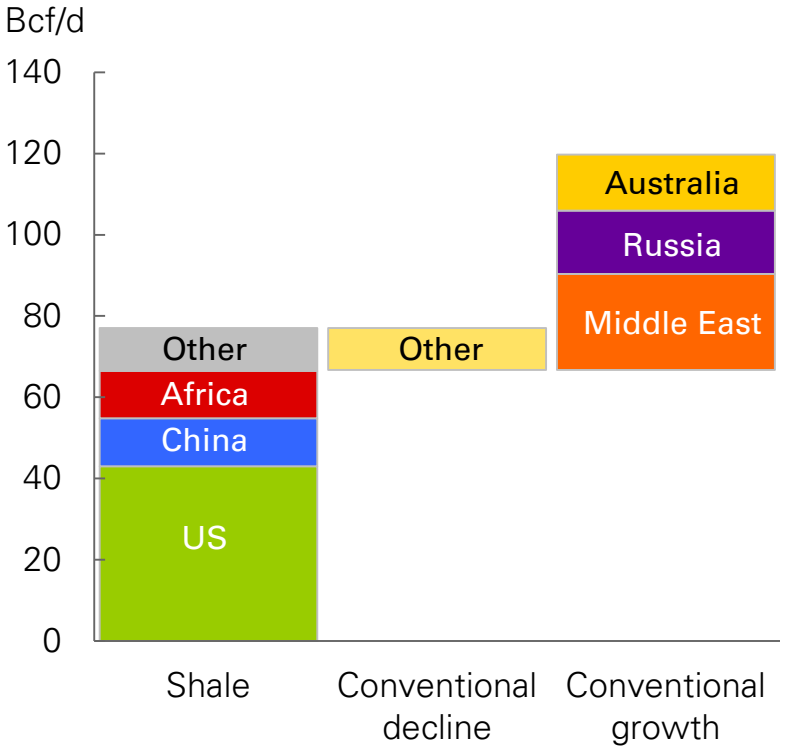
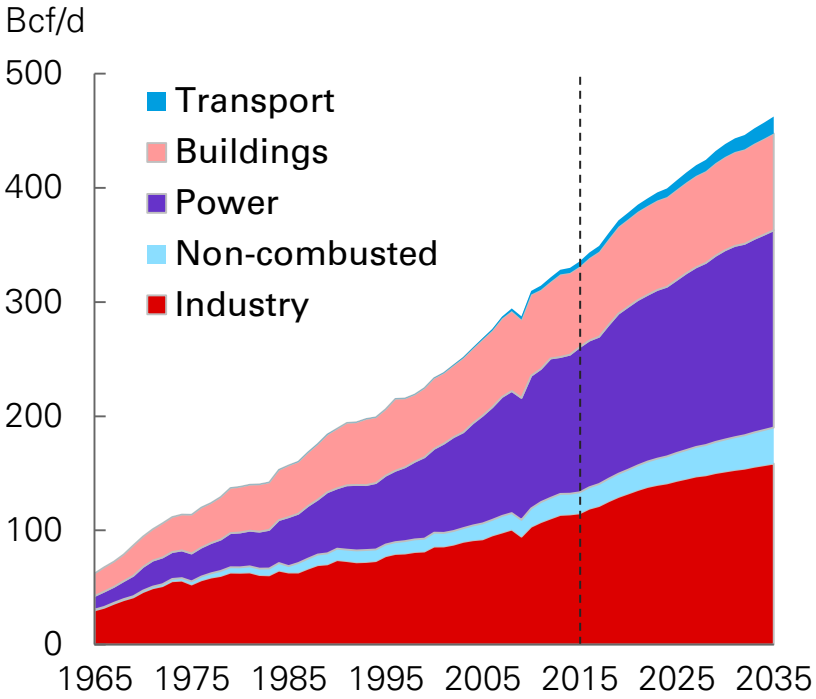
Natural gas

Gas supply growth: 2015-2035



Gas consumption by sector



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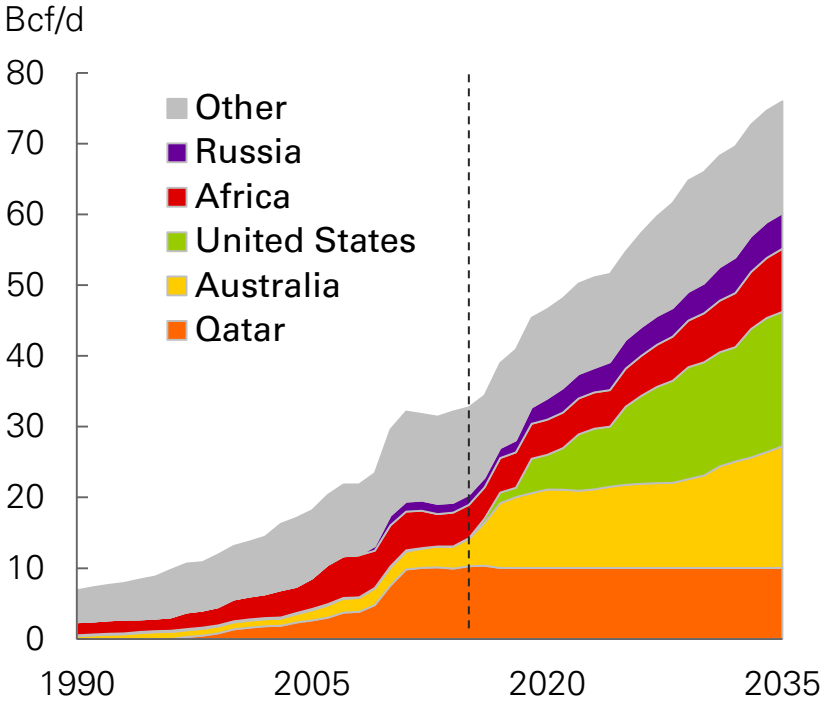
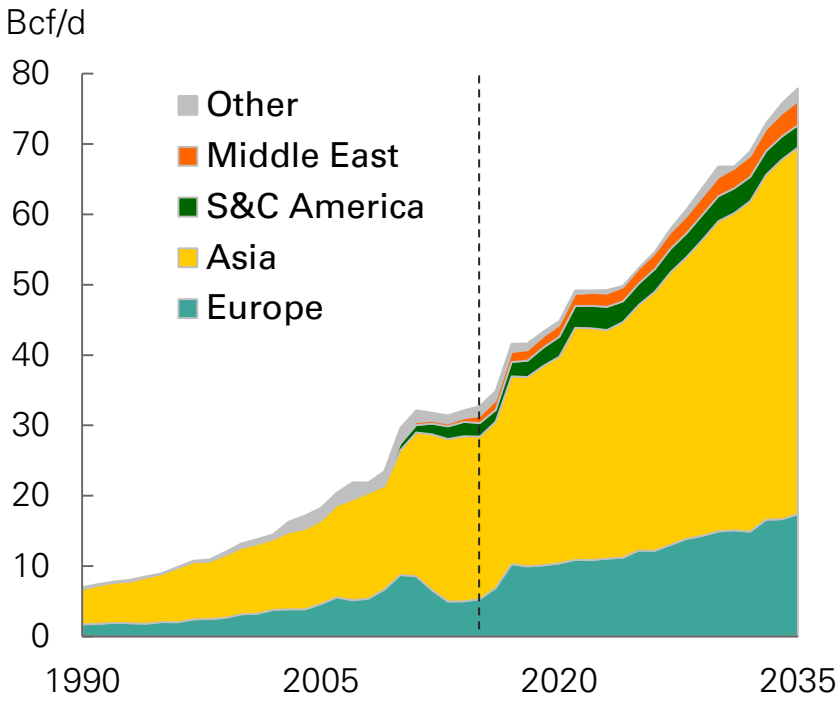
Growth of LNG

LNG supply



LNG demand



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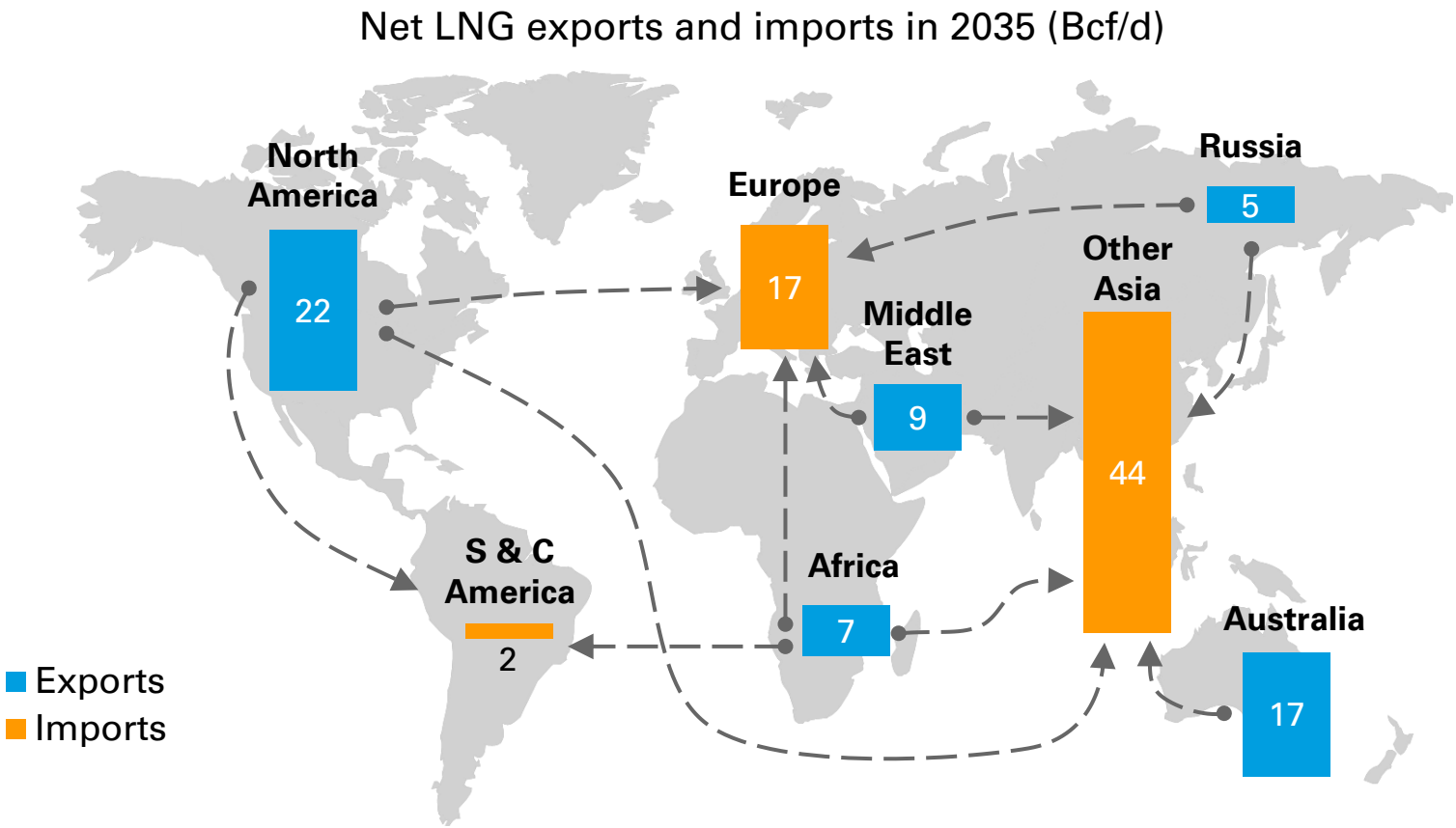
LNG Trade



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Carbon emissions

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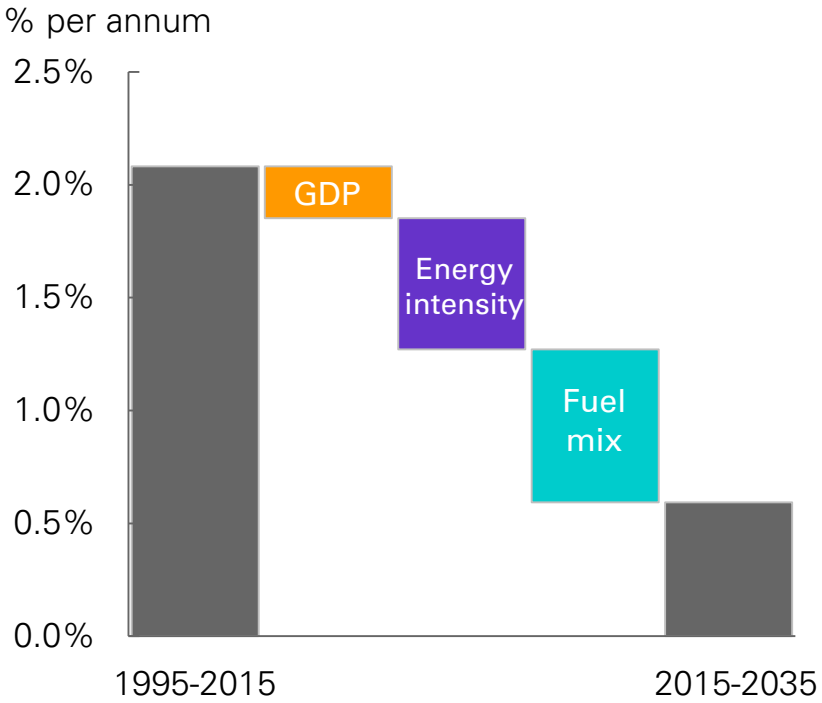
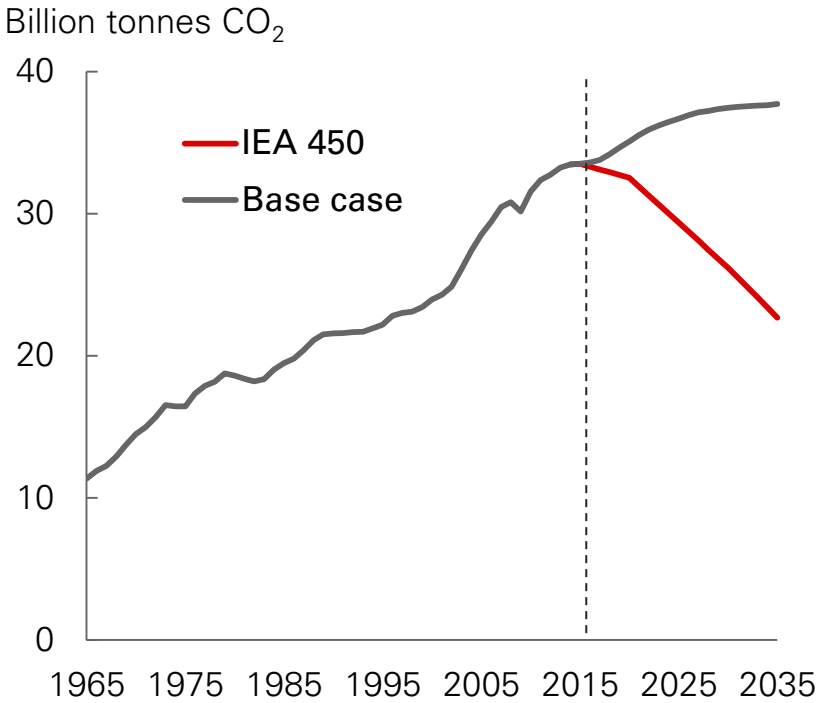
Carbon emissions

Contributions to slower growth of carbon emissions



Carbon emissions



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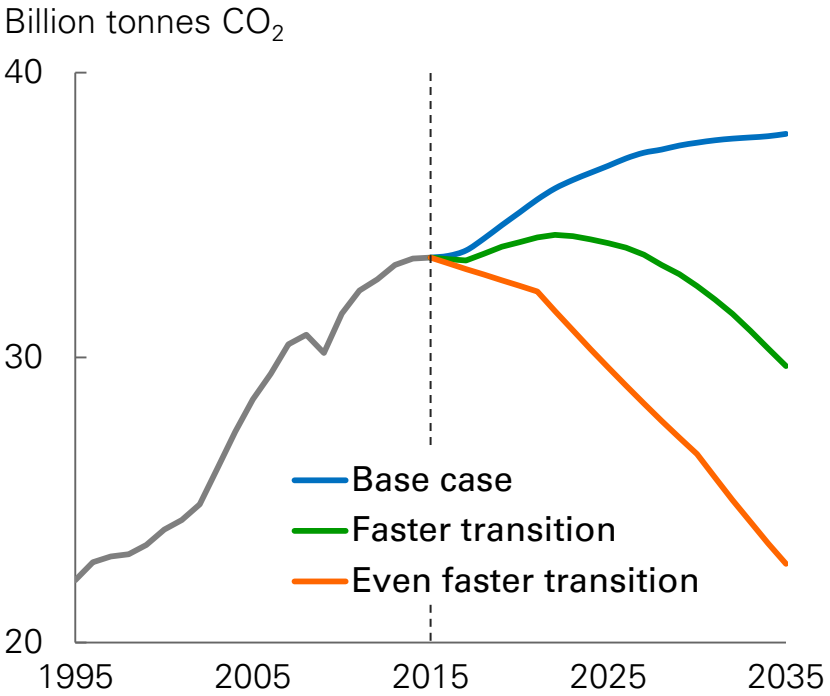
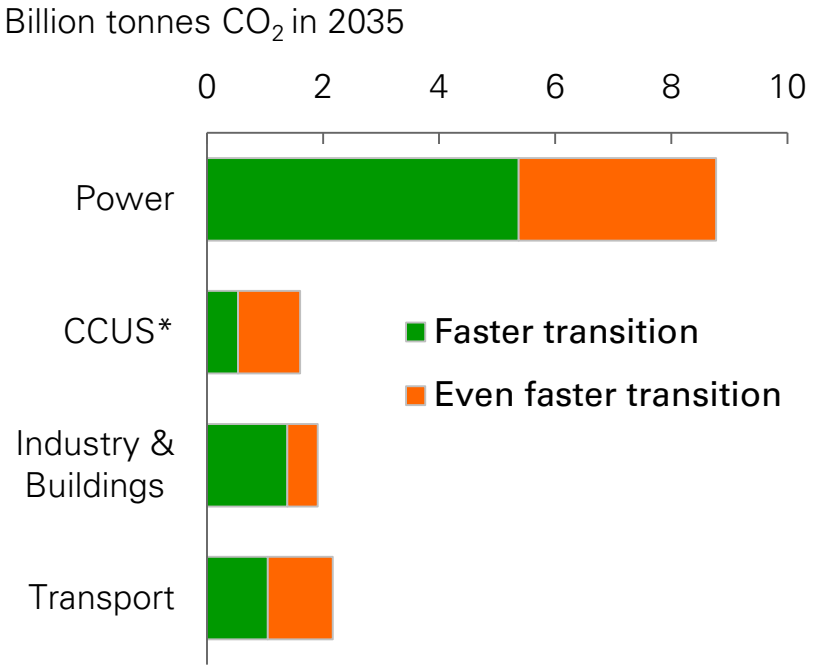
Faster transition pathways

Carbon emissions



Reductions in emissions versus base case



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

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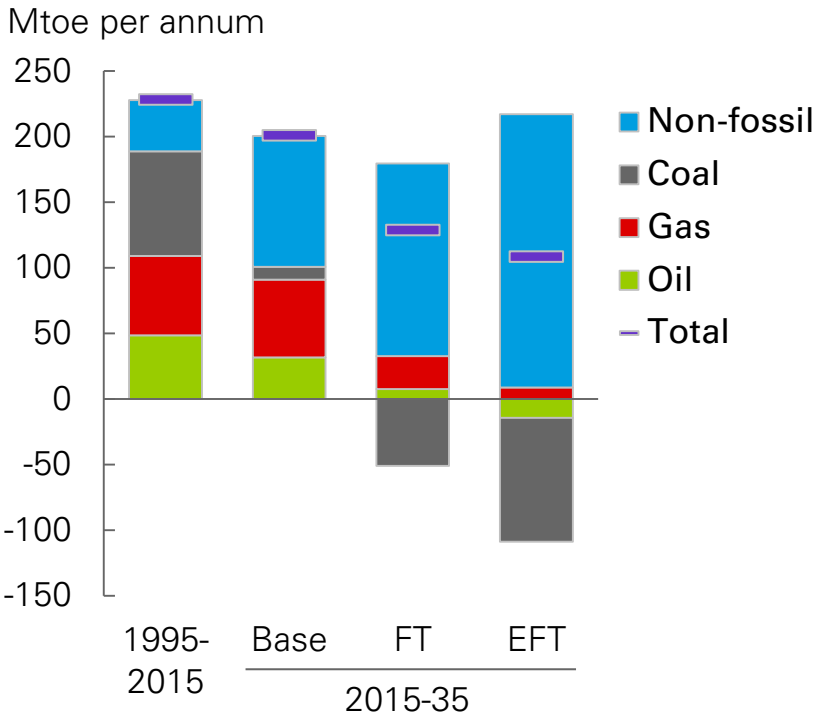
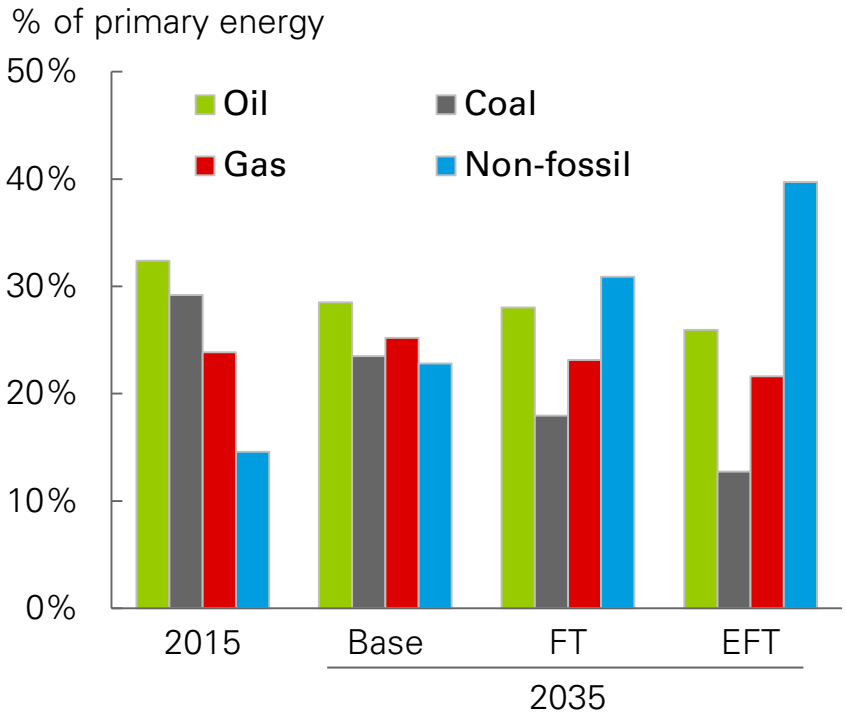
Energy outlook under alternative transition pathways

Annual demand growth by fuel



The changing fuel mix



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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%

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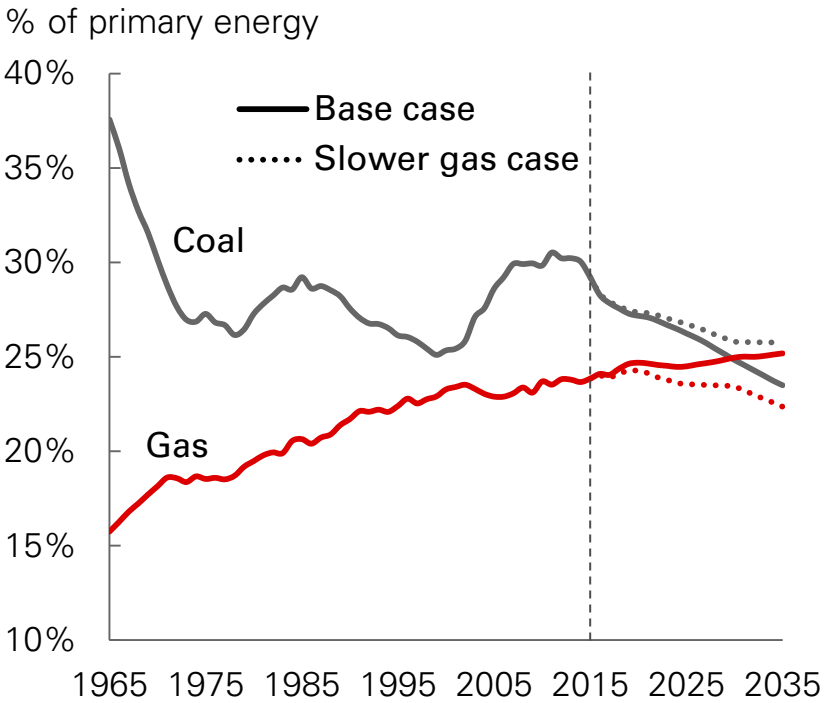
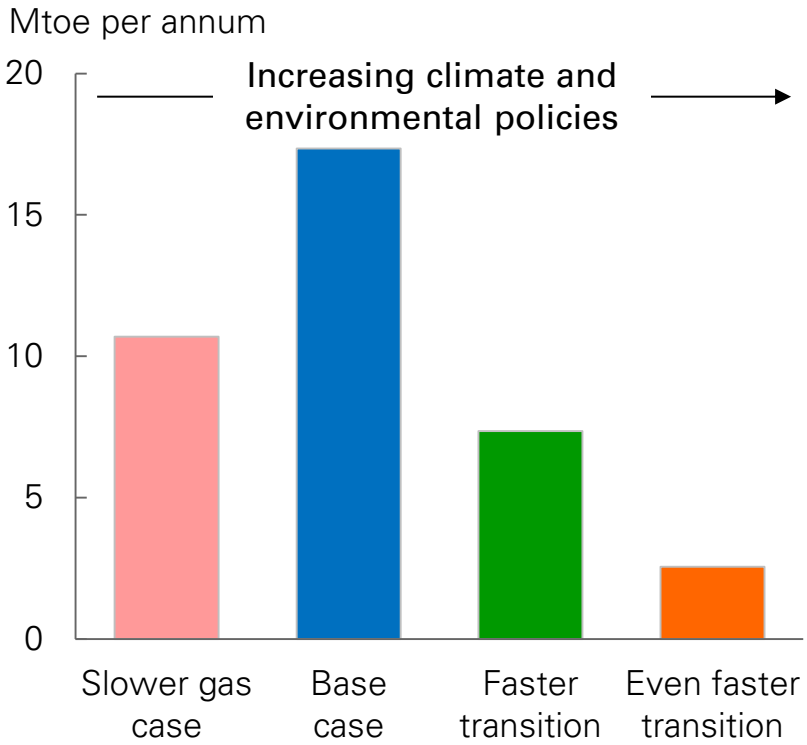
Risks to gas demand

Global primary energy shares



Natural gas growth 2015-2035



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