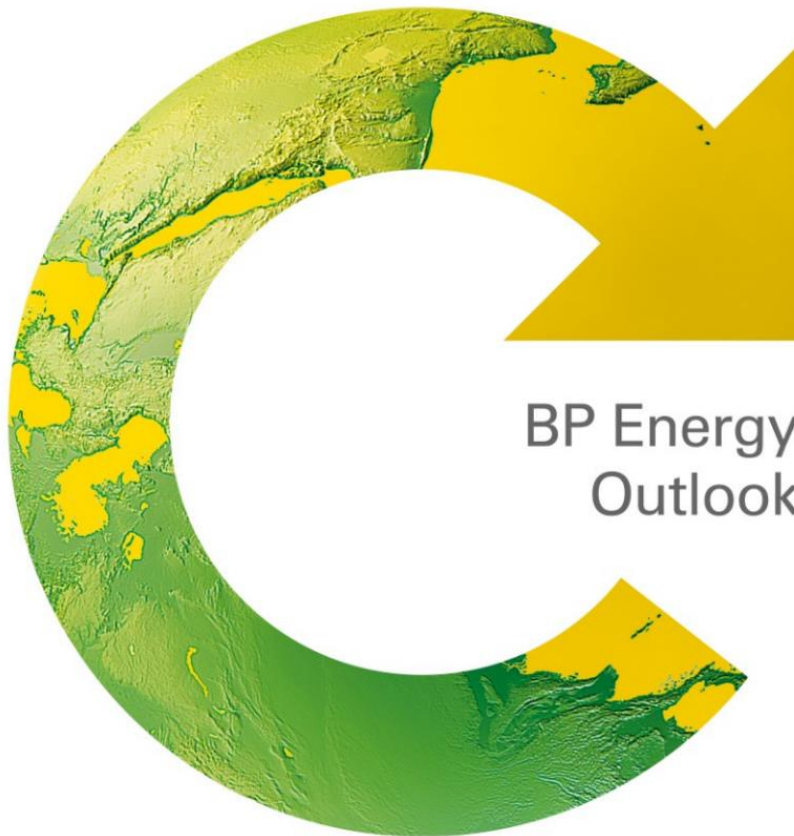


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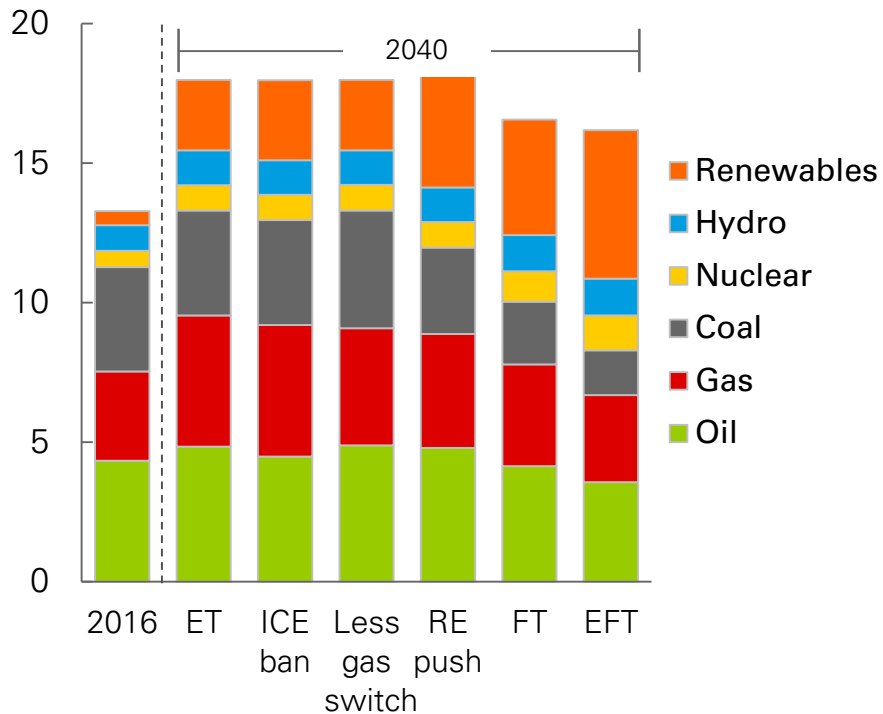
Mark Finley
General Manager

Alternative scenarios



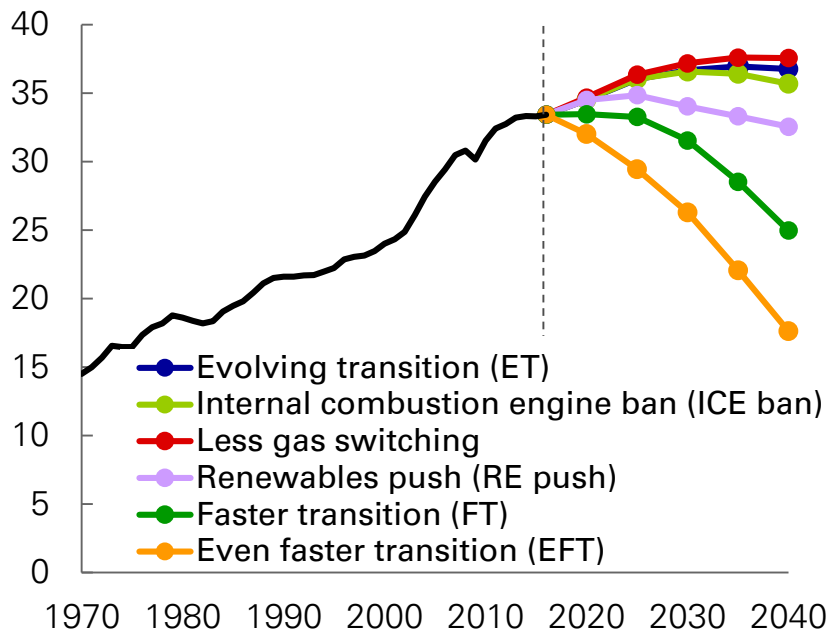
Primary energy consumption by fuel

Billion toe



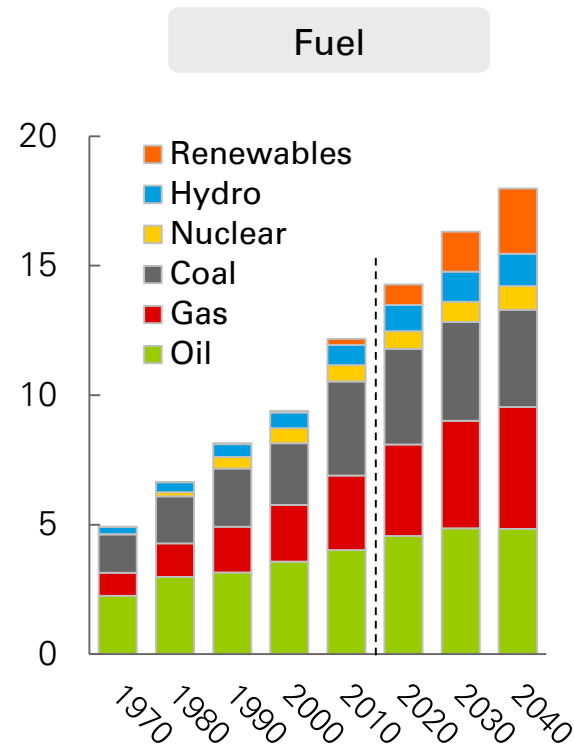
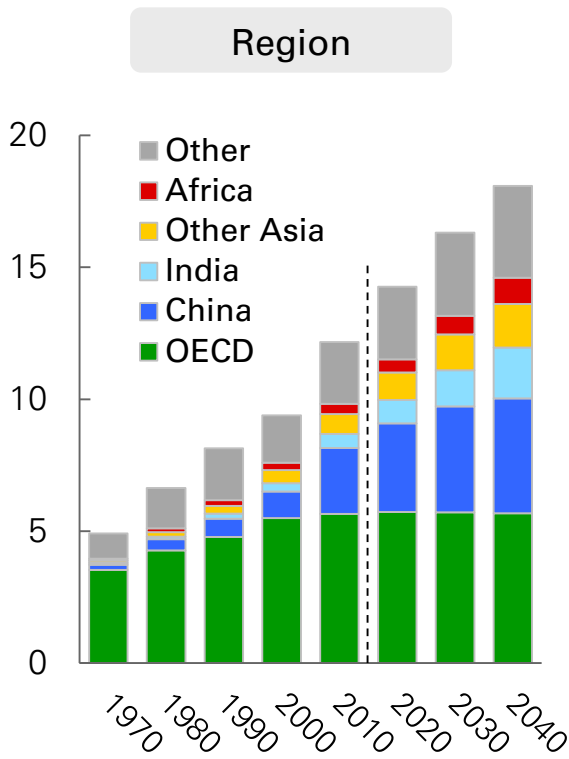
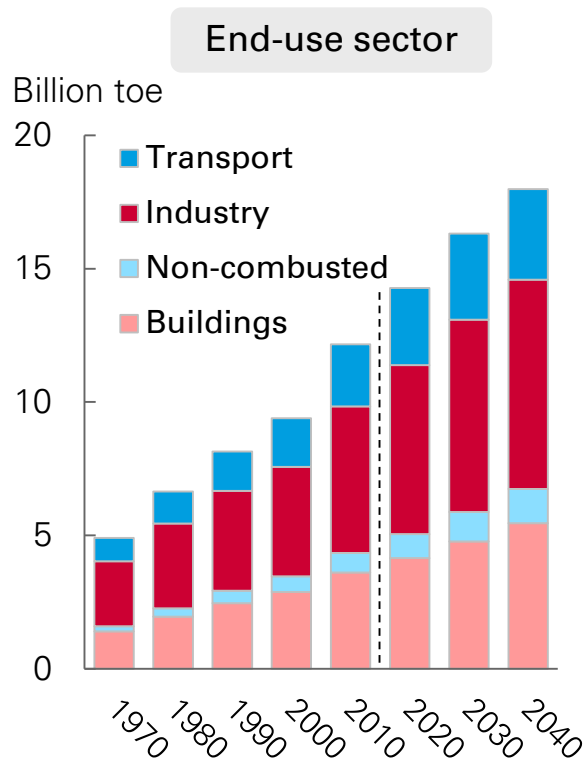
Carbon emissions

Billion tonnes CO₂



Three windows on the energy transition

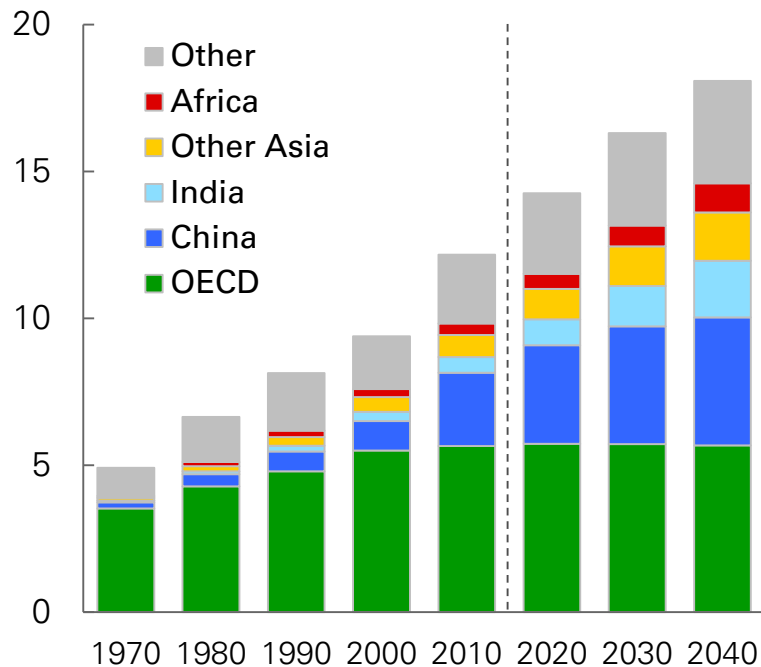
Primary energy demand



Regional energy demand

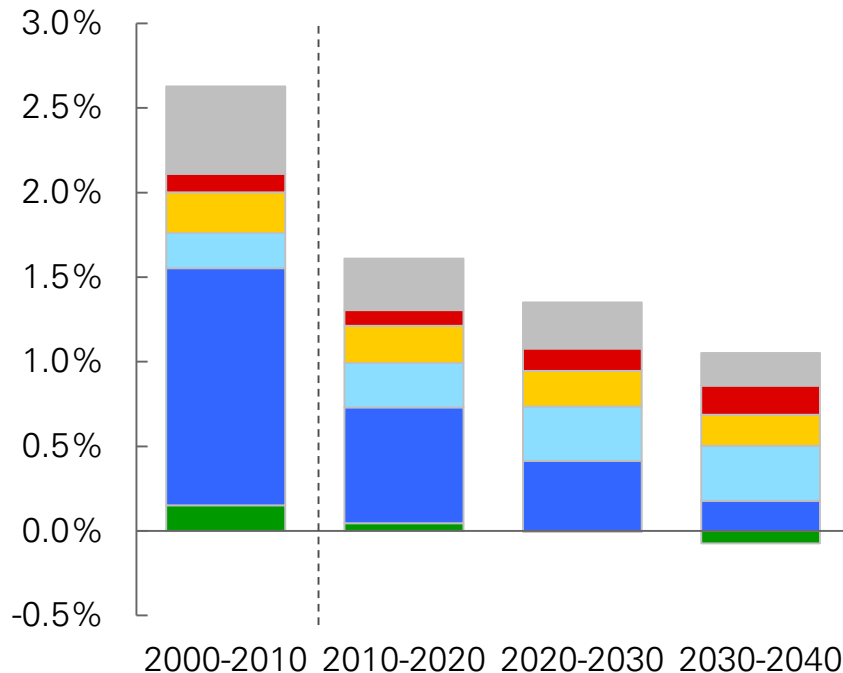
Primary energy consumption by region

Billion toe



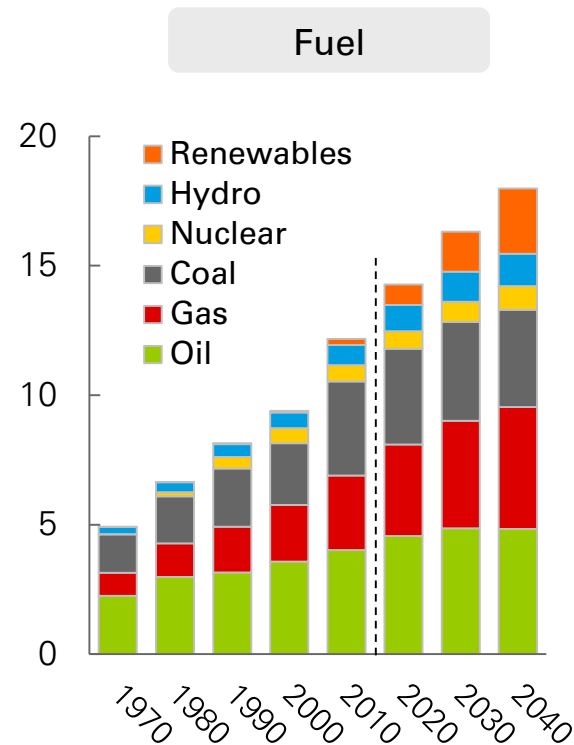
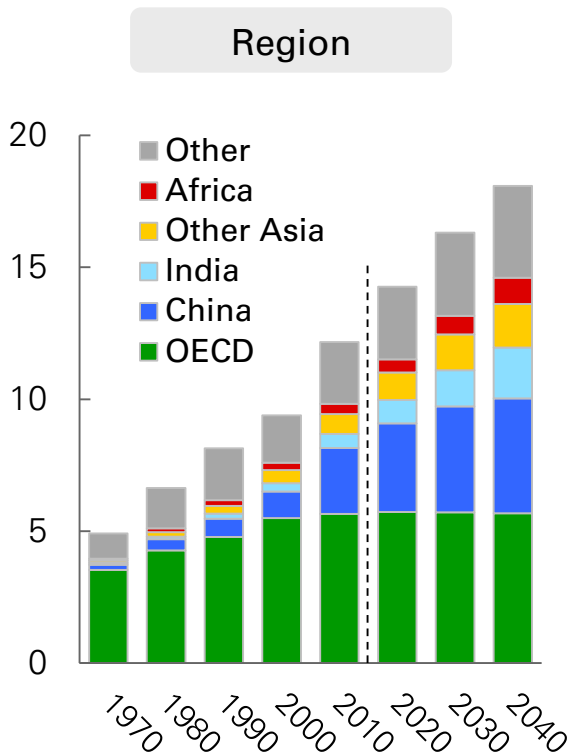
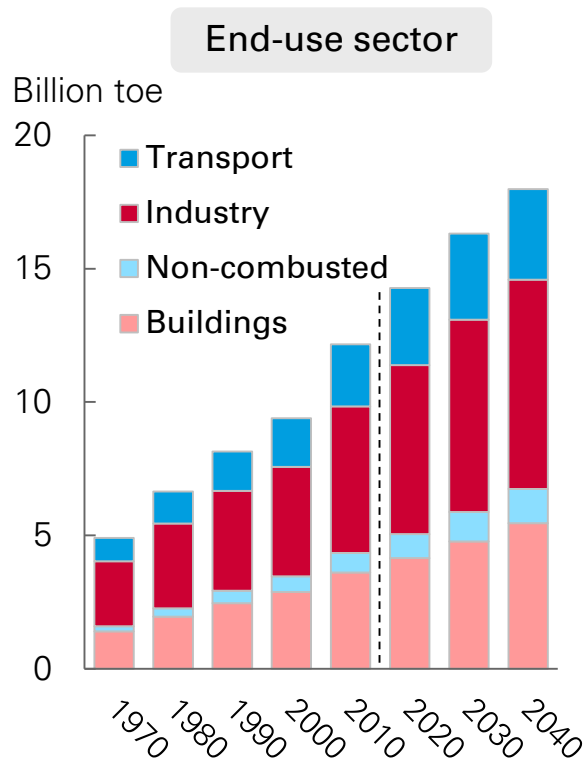
Primary energy growth and regional contributions

% per annum



Three windows on the energy transition

Primary energy demand

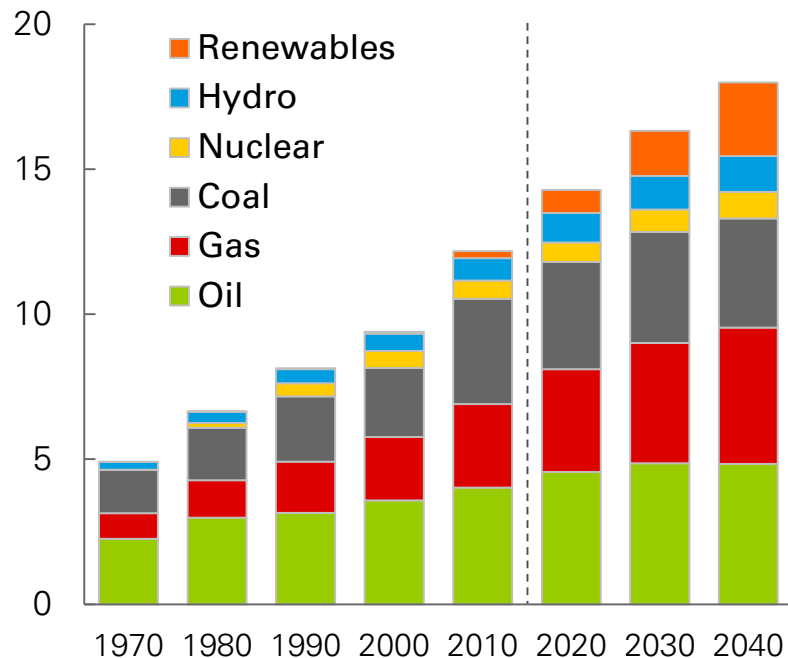


Global energy by fuel

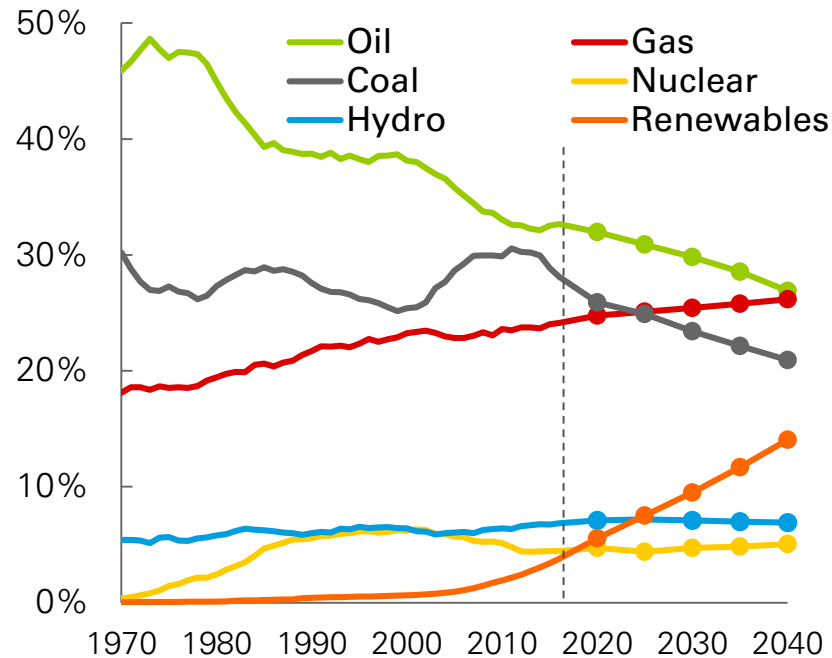


Primary energy consumption by fuel

Billion toe



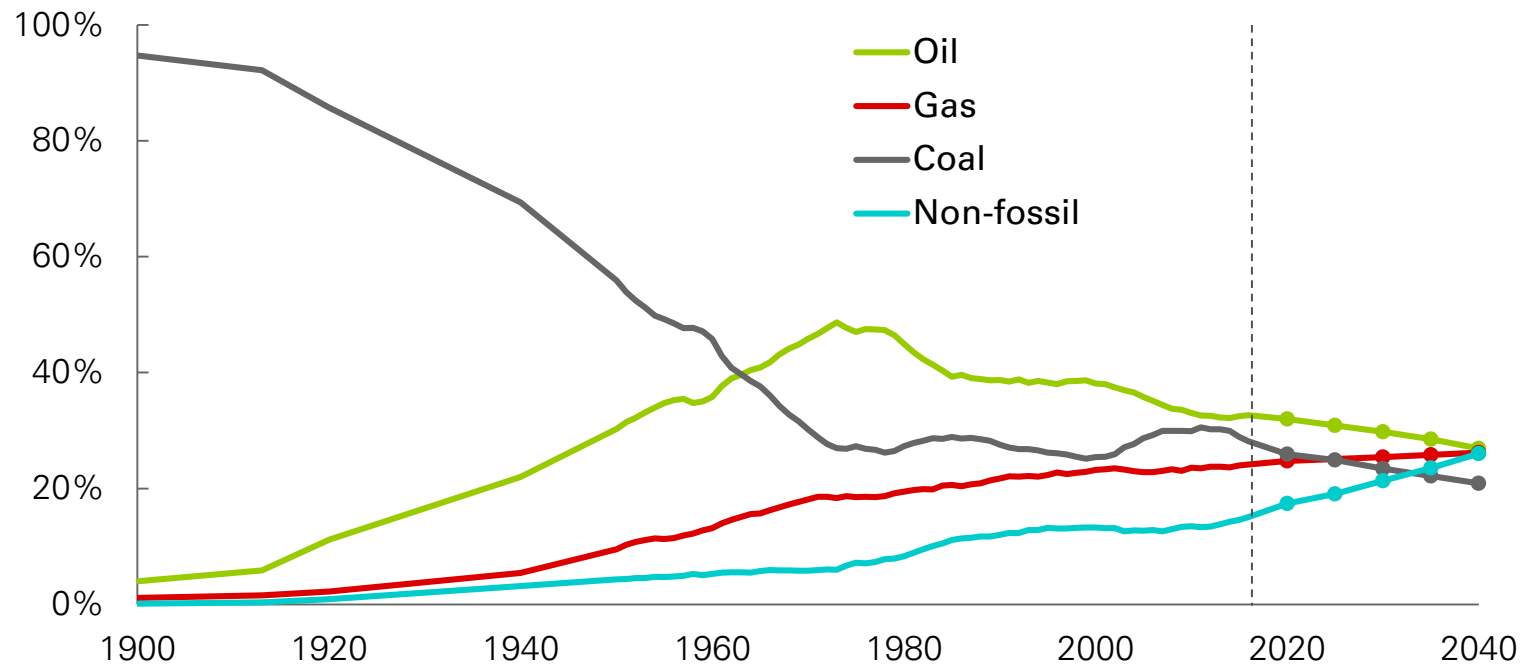
Shares of primary energy



Diversified fuel mix



Shares of primary energy



Five key questions

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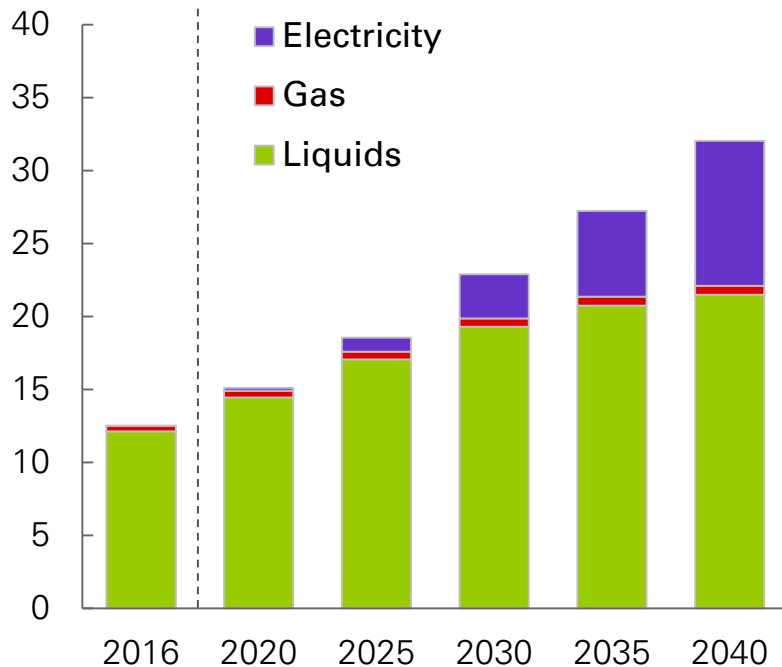
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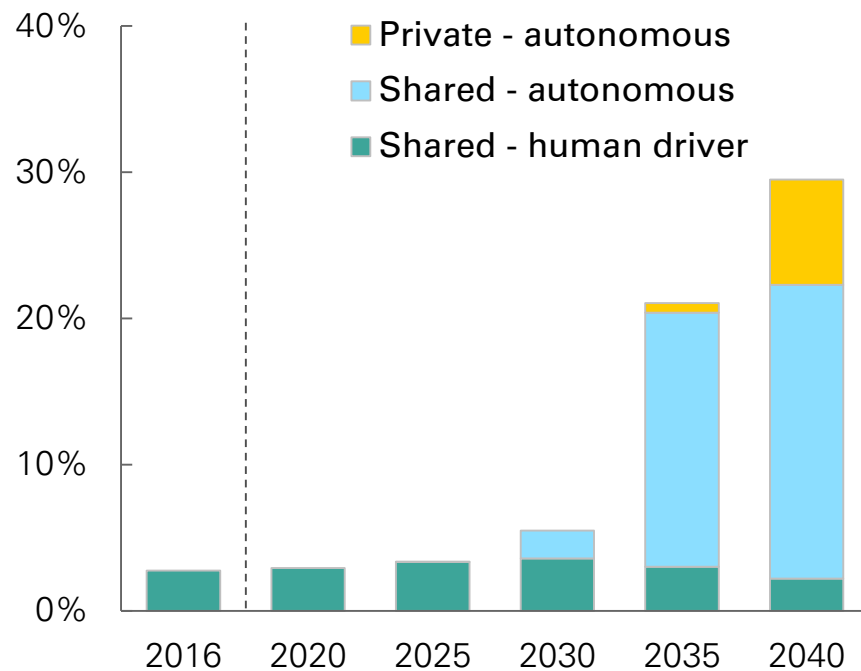
Electric cars, shared mobility and autonomy

Car kilometres by fuel type

Trillion km

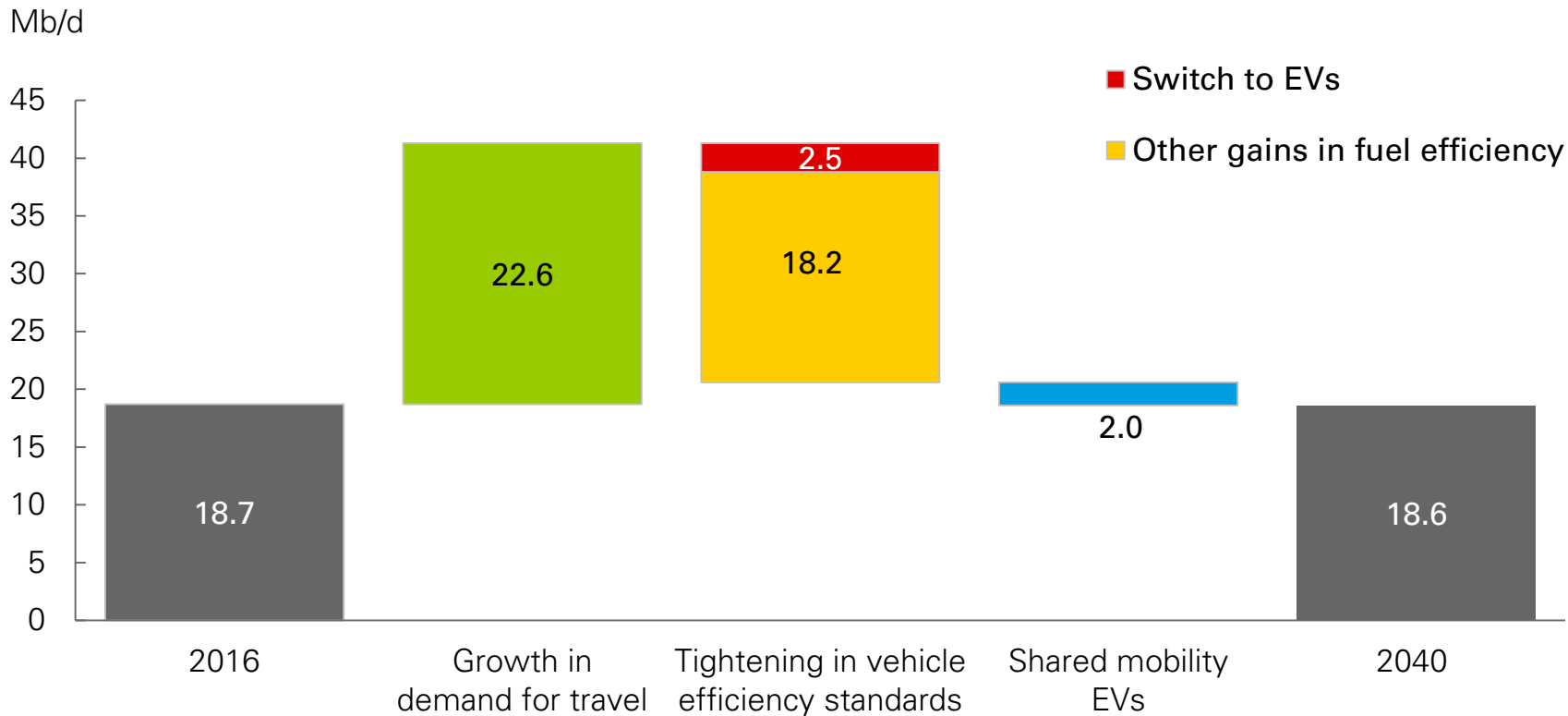


New mobility share of Vkm

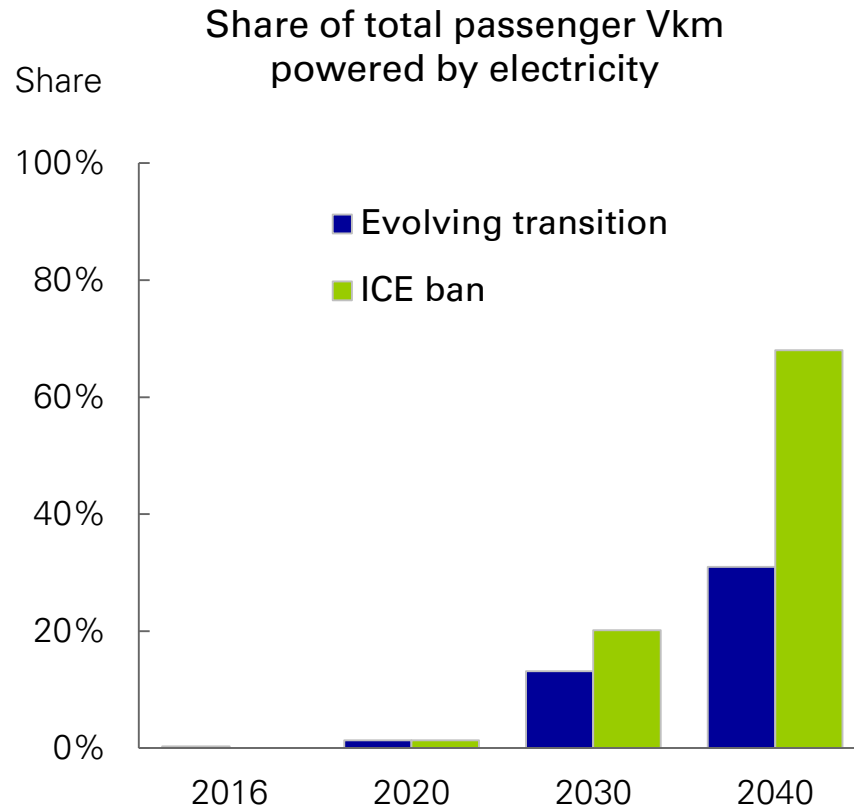
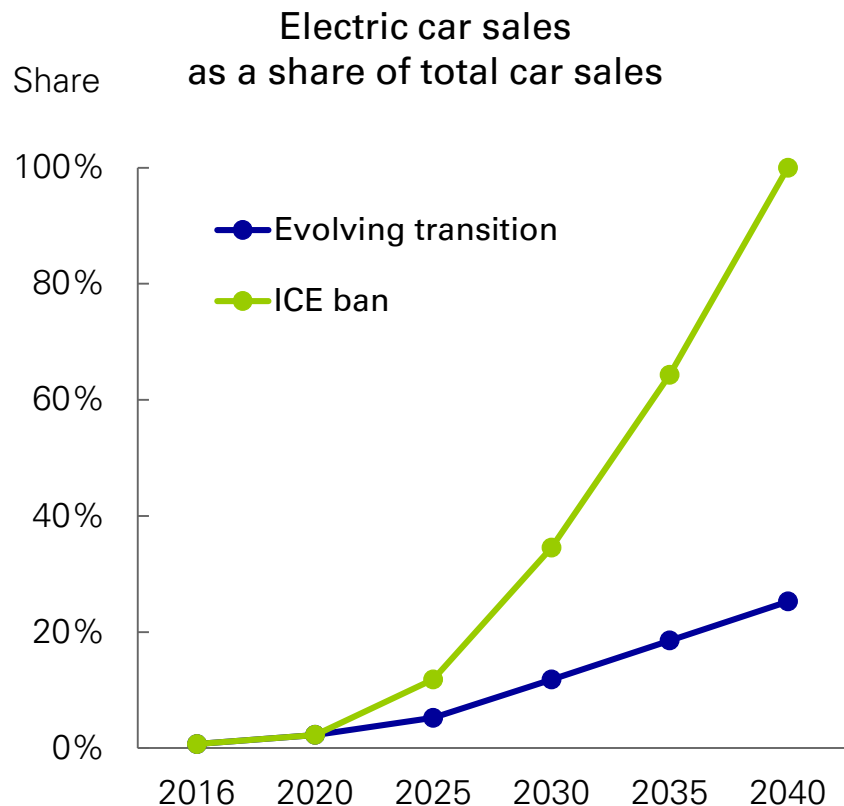


Liquid fuel demand from passenger cars

Changes in liquids demand from cars: 2016-2040

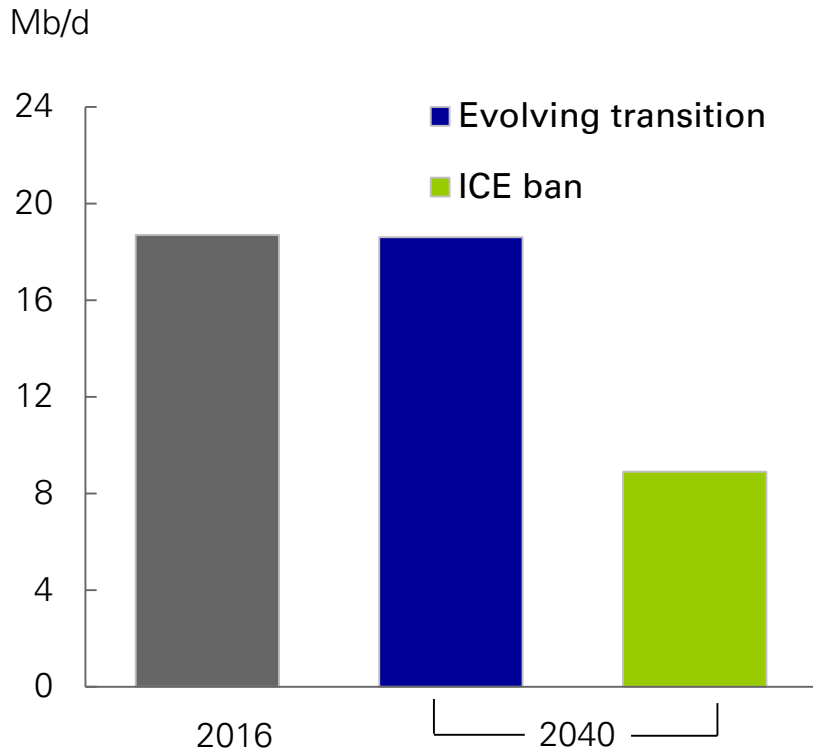


Global ban on internal-combustion engine (ICE) cars

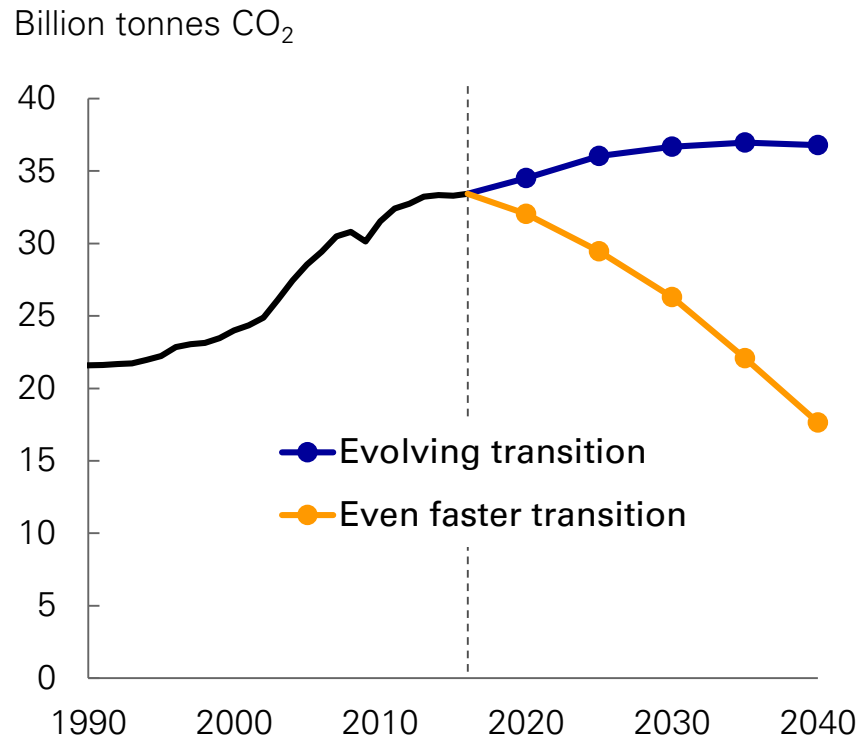


Impact of ICE ban

Passenger cars liquids demand

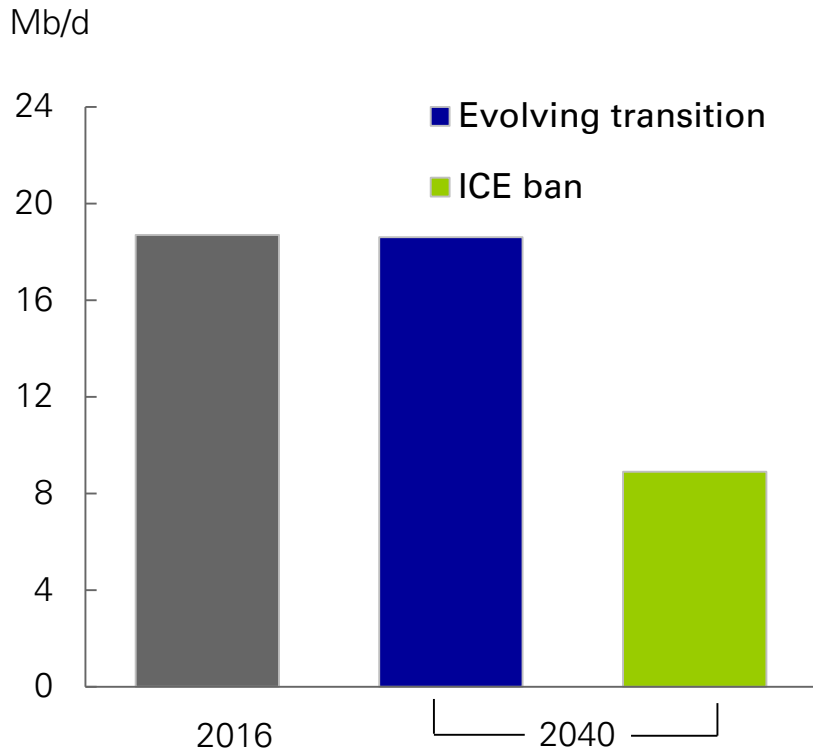


Carbon emissions from energy

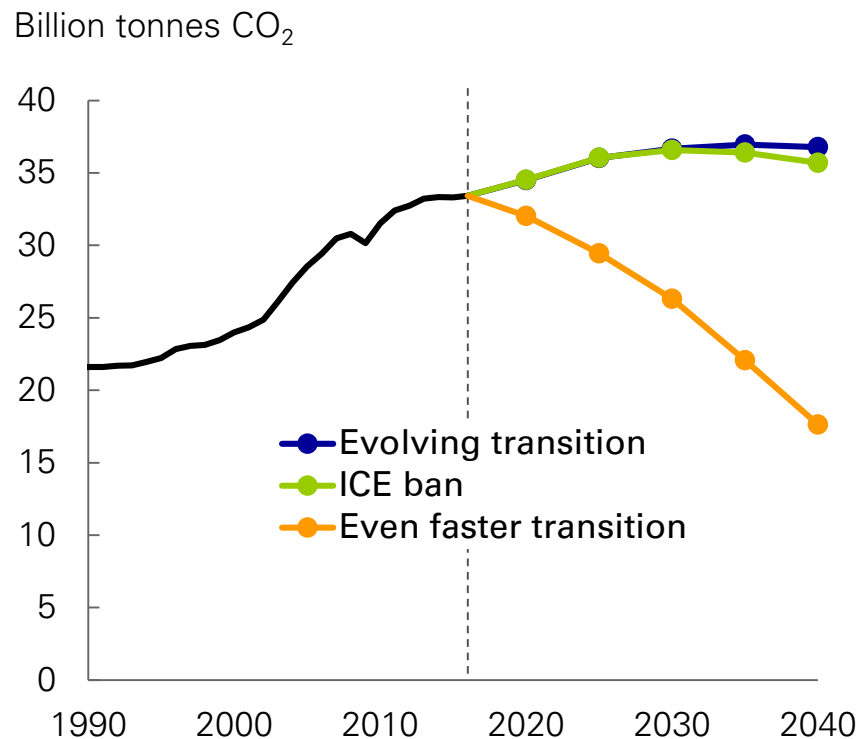


Impact of ICE ban

Passenger cars liquids demand



Carbon emissions from energy

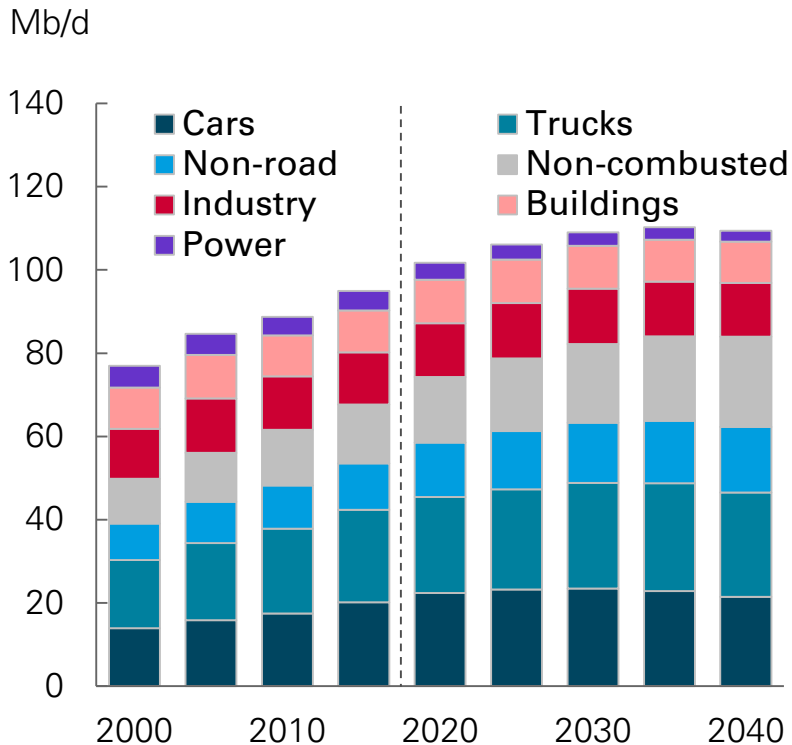


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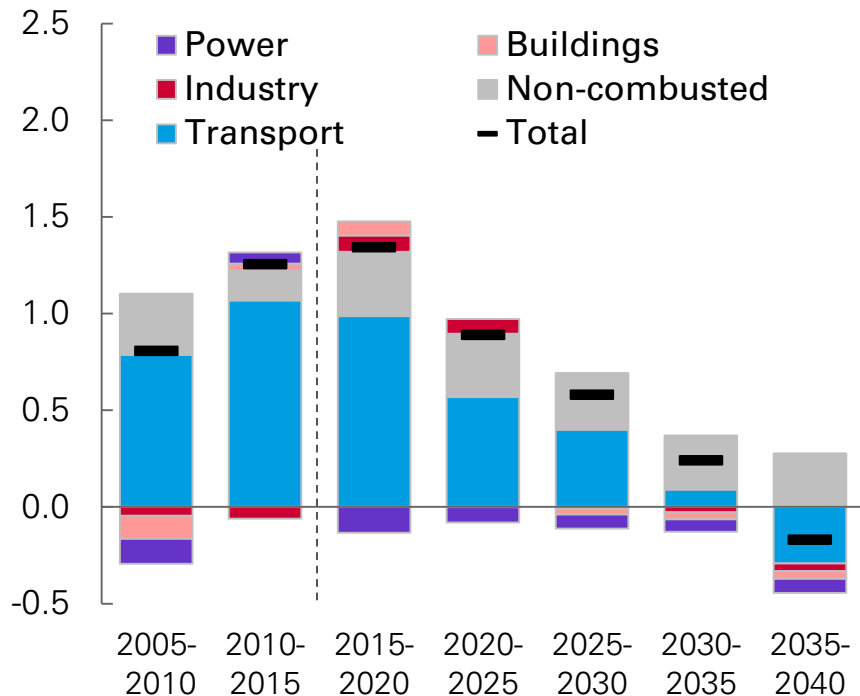
Demand for oil and other liquid fuels

Liquids demand



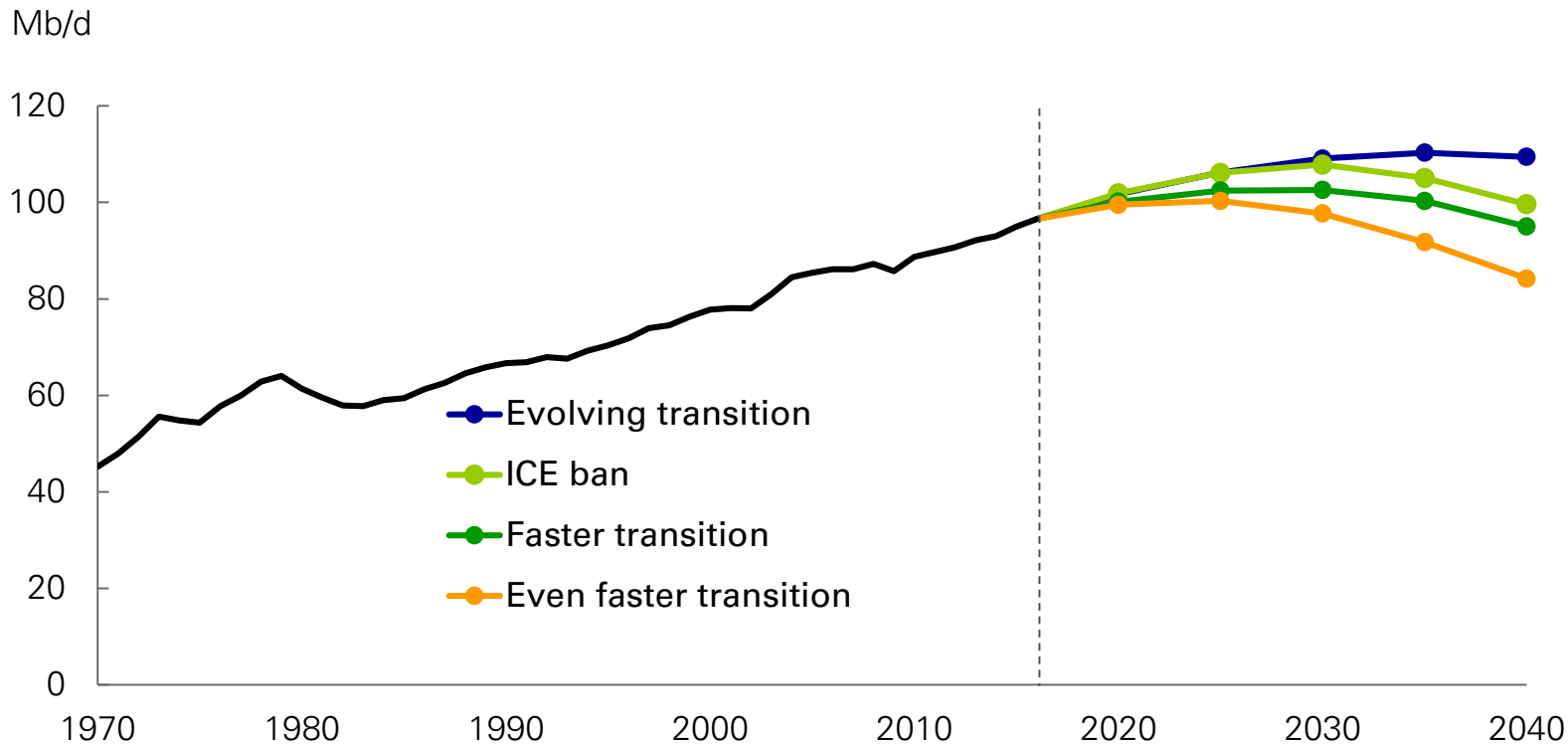
Liquids demand growth

Mb/d, average annual growth



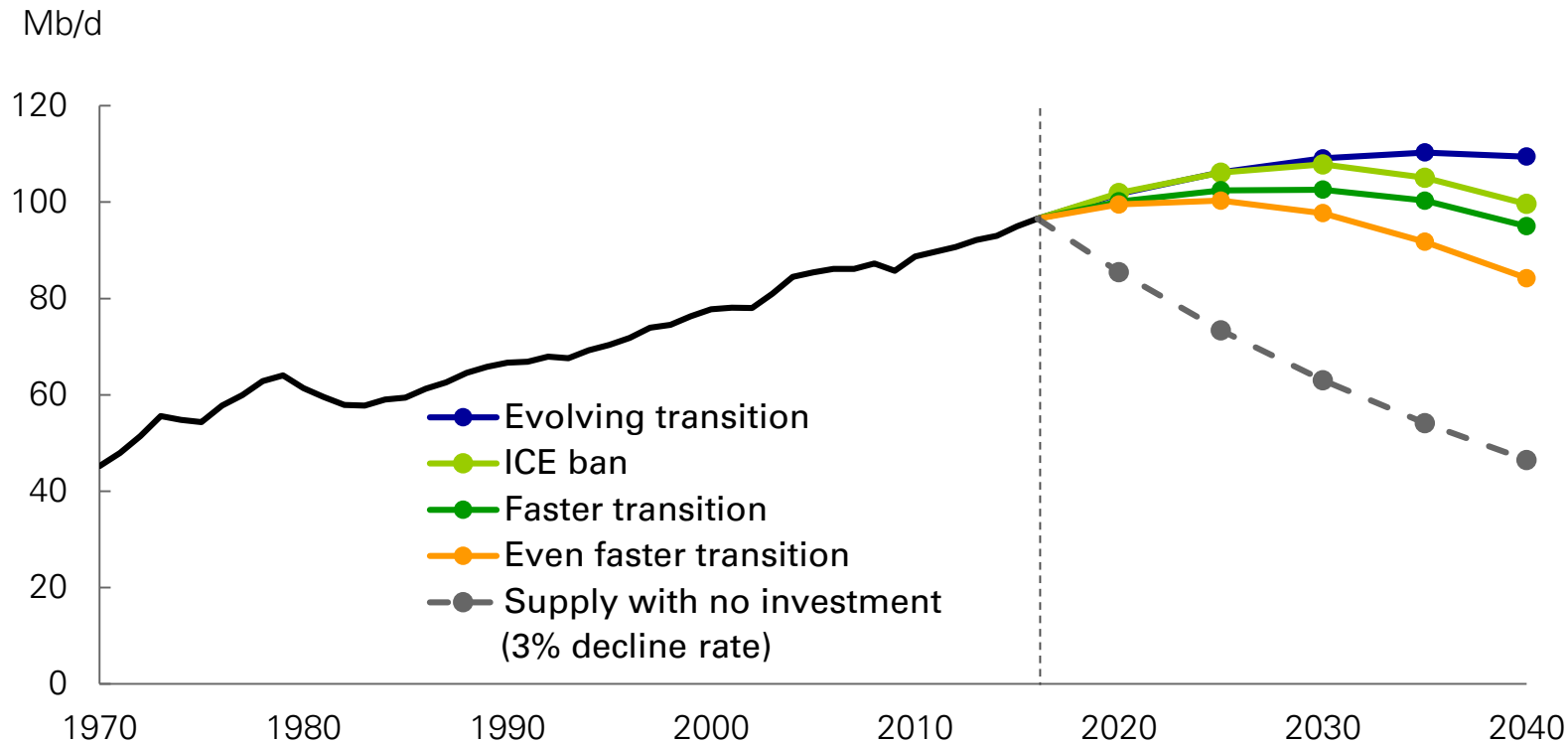
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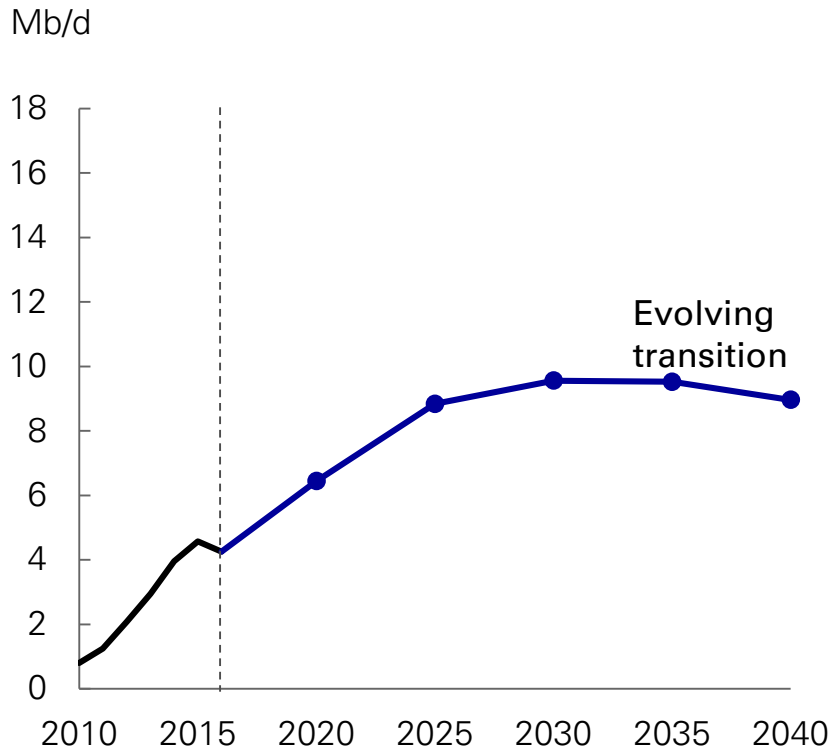
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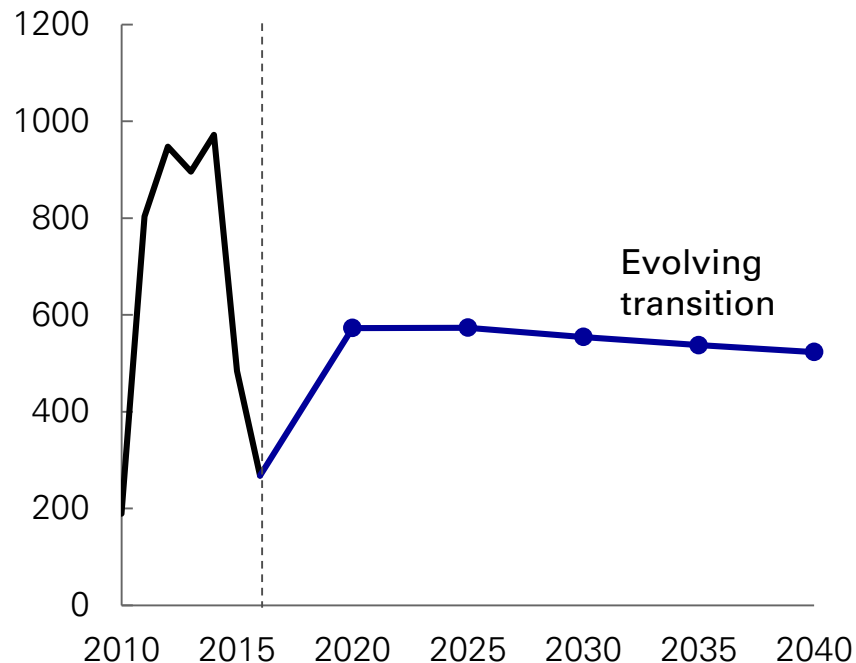


US tight oil: alternative scenarios

US tight oil production



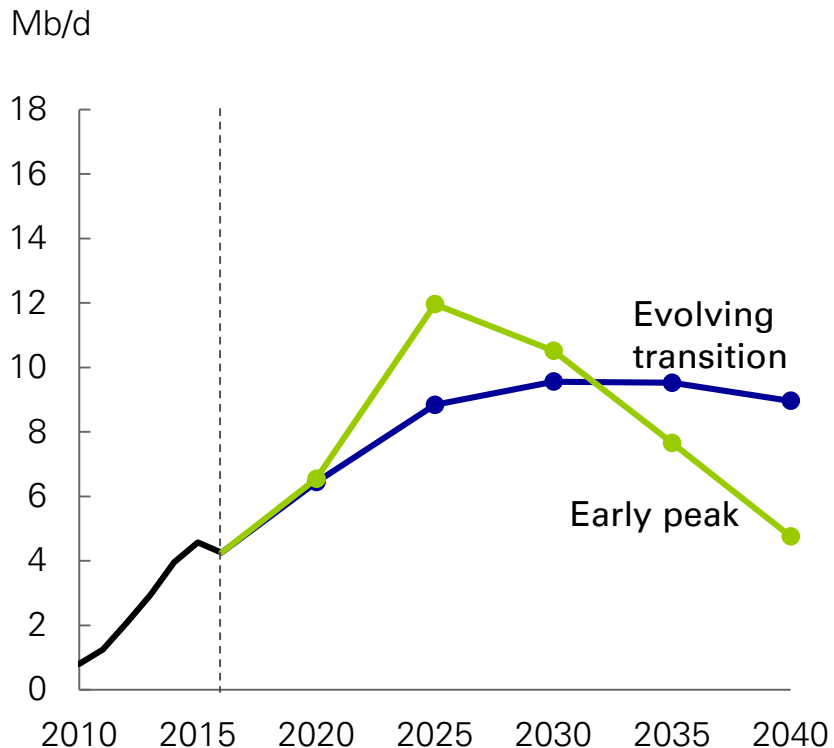
Number of US oil rigs
(in the four main producing regions*)



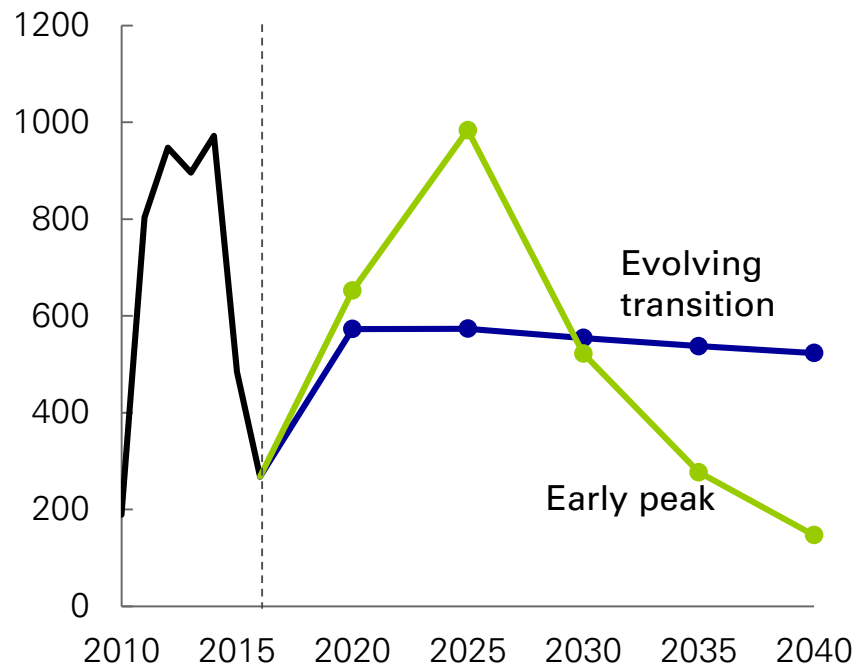
*Permian, Eagle Ford, Bakken and Niobrara

US tight oil: alternative scenarios

US tight oil production



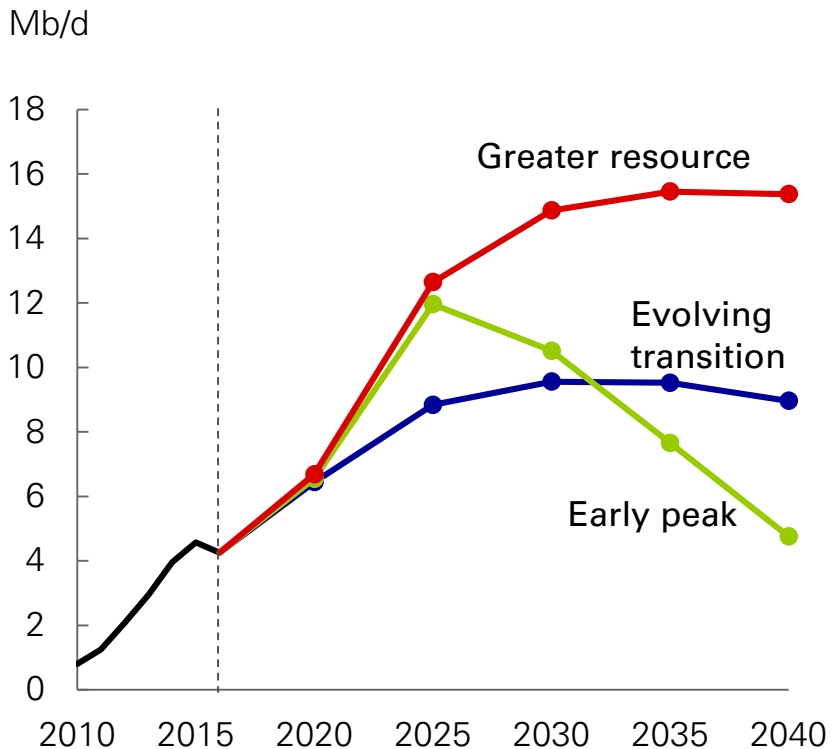
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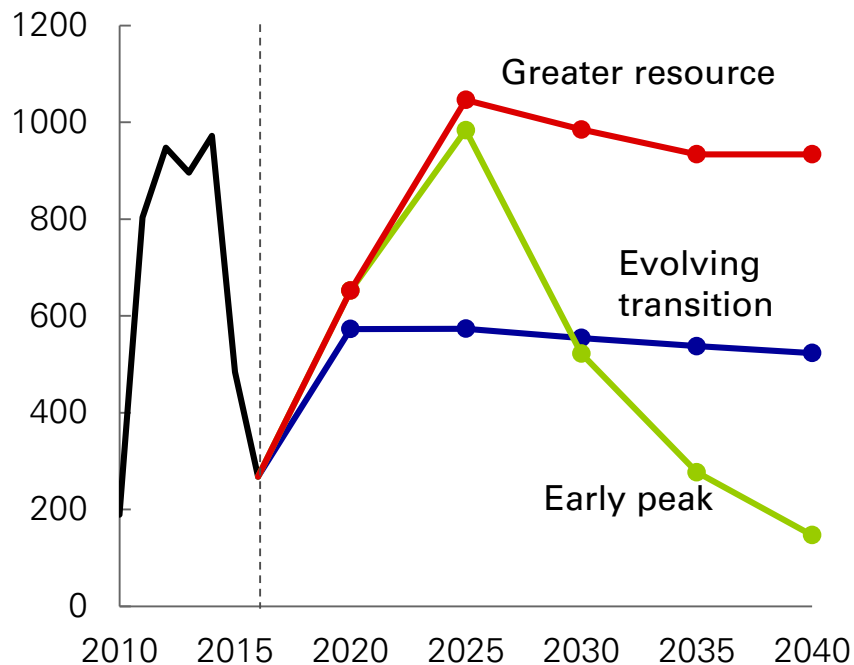
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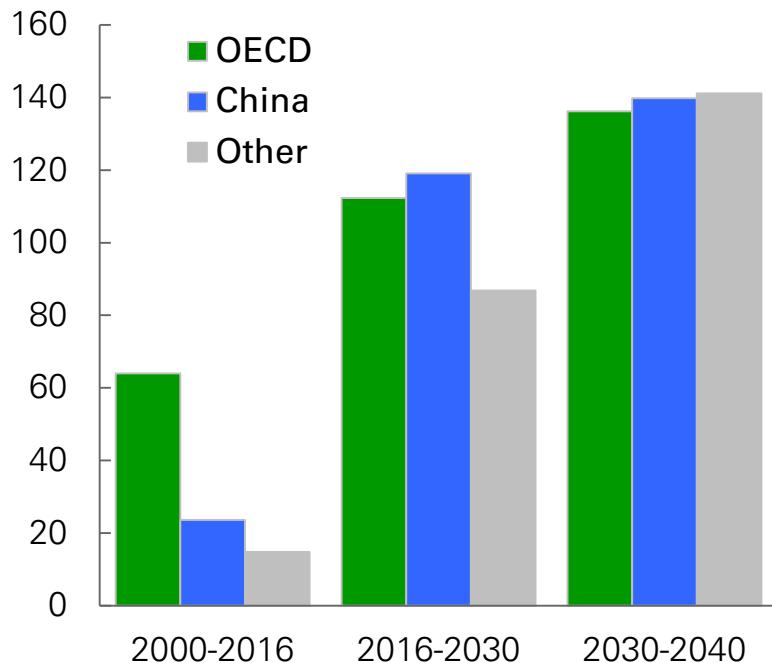
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Rapid growth in renewable energy

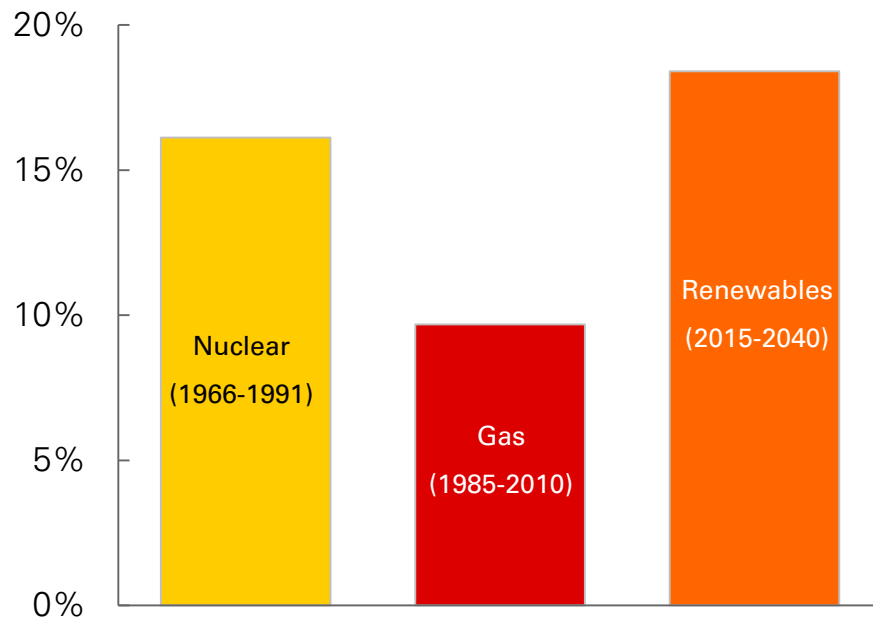
Growth of renewable power

TWh, average annual growth



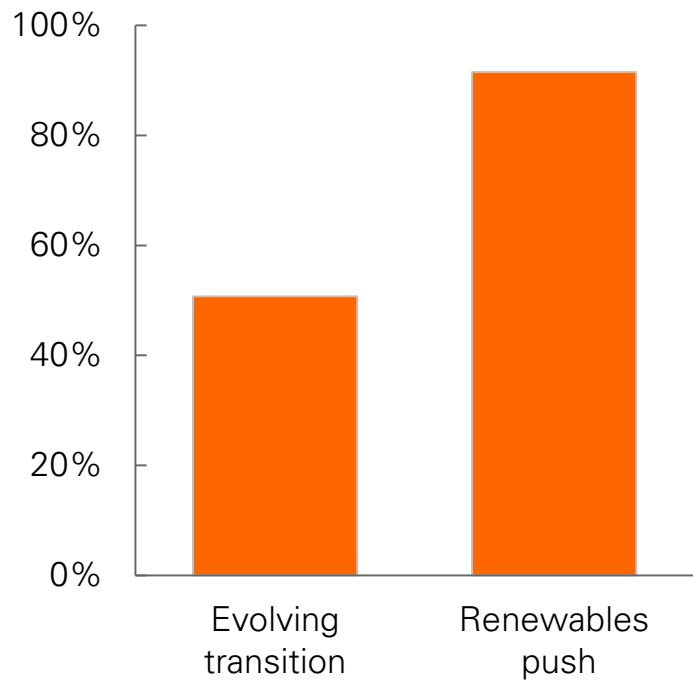
Pace of power market penetration

Largest gains in market share over 25 years, %pts



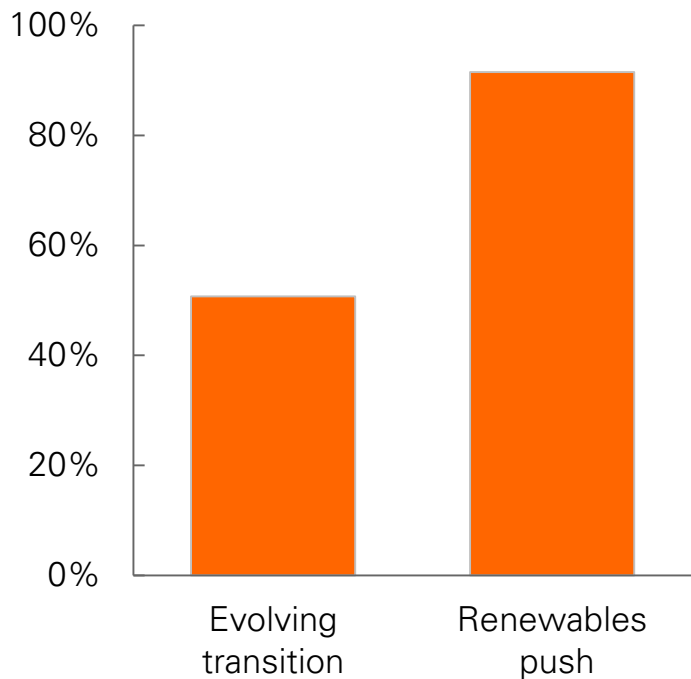
'Renewables push' scenario

Renewables share of power growth
2016-2040

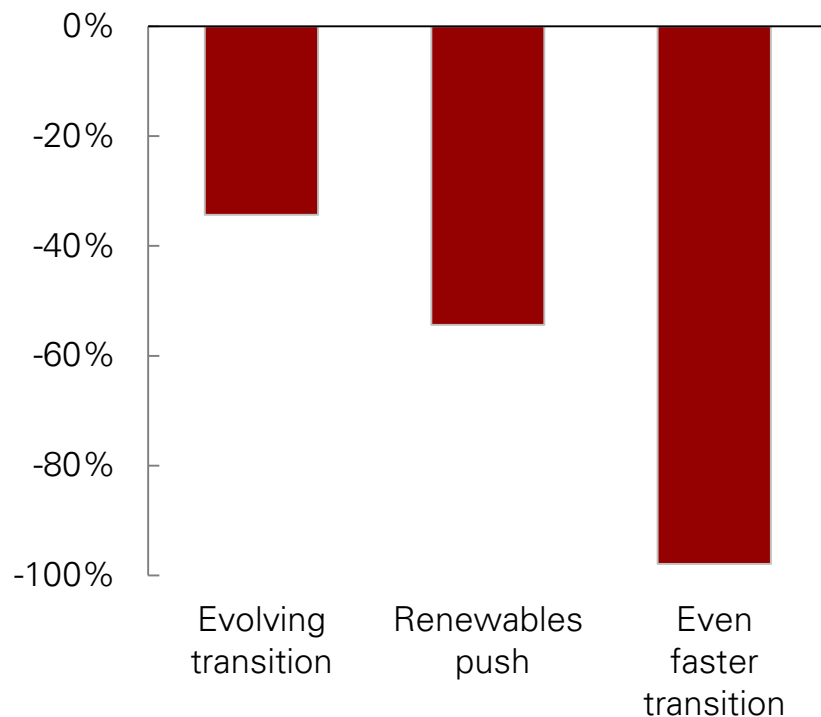


'Renewables push' scenario

Renewables share of power growth
2016-2040



Change in carbon intensity of power
2016-2040



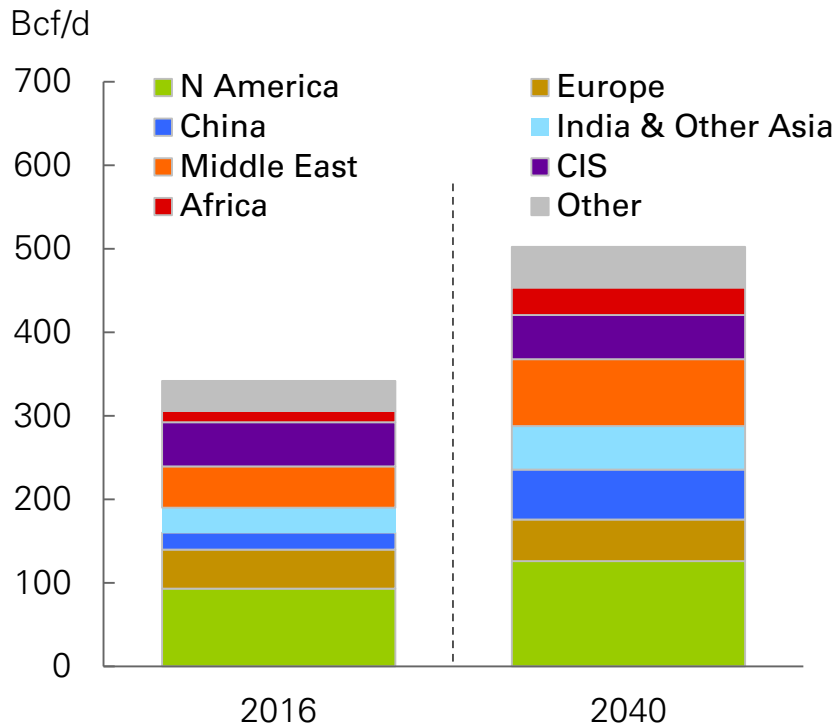
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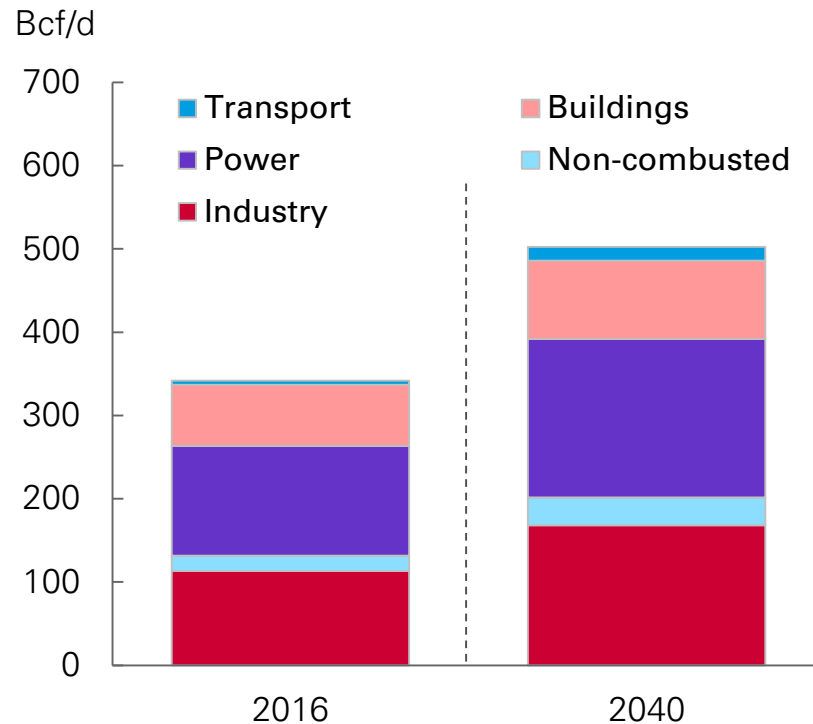
Growth in natural gas demand



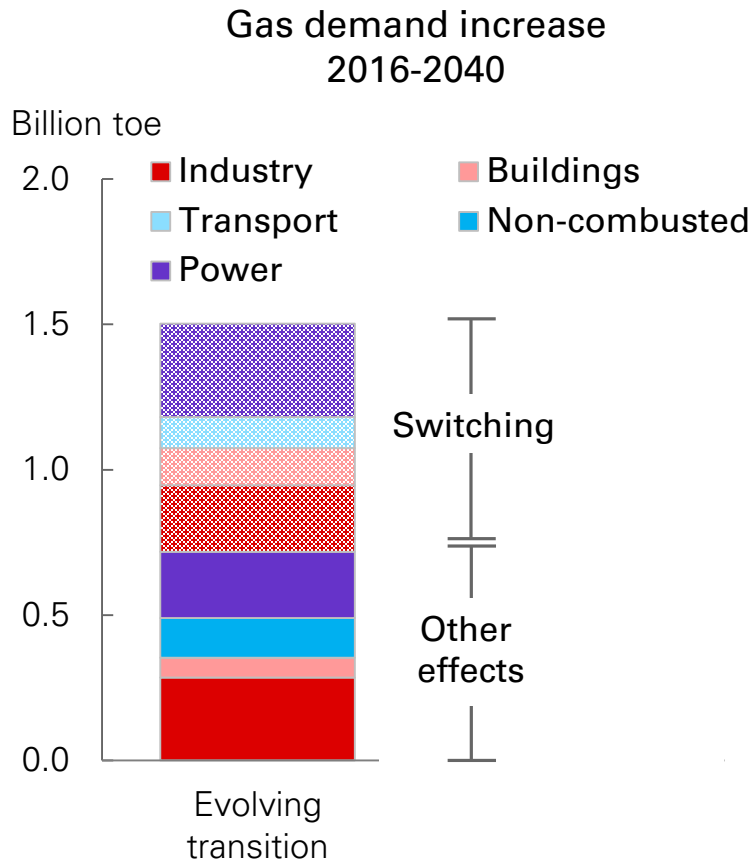
Gas consumption by region



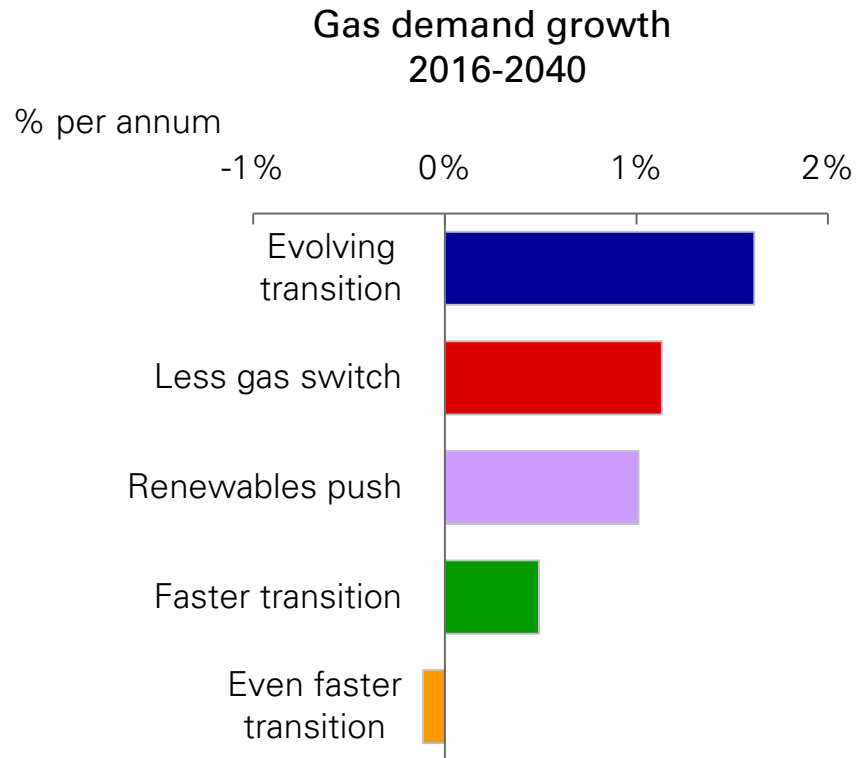
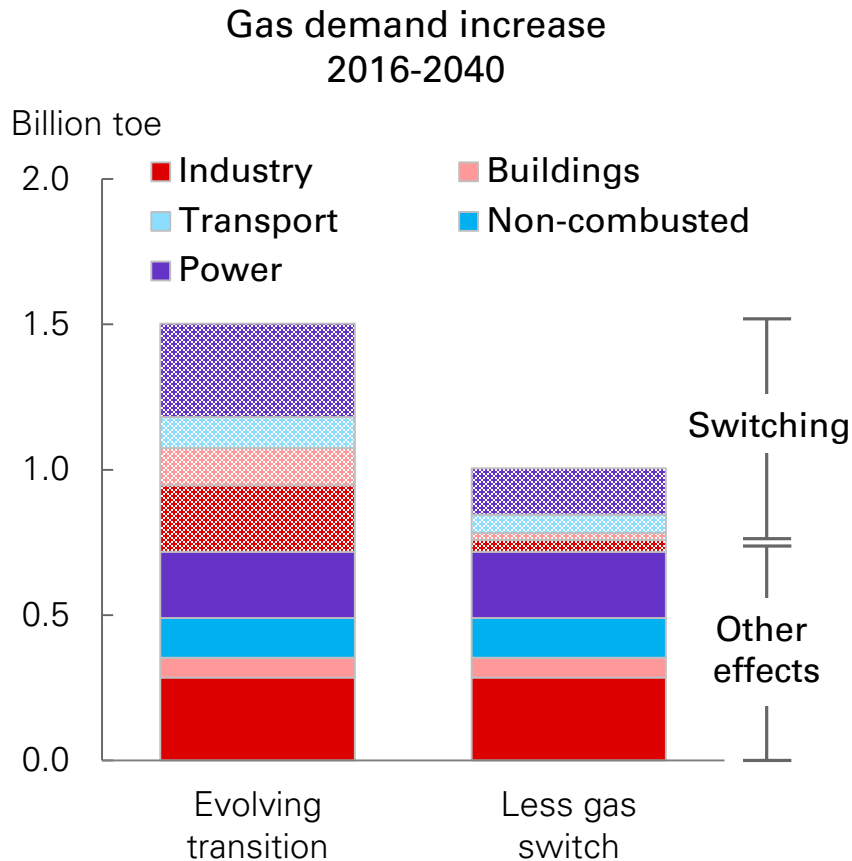
Gas consumption by sector



Possible risks to the outlook for natural gas

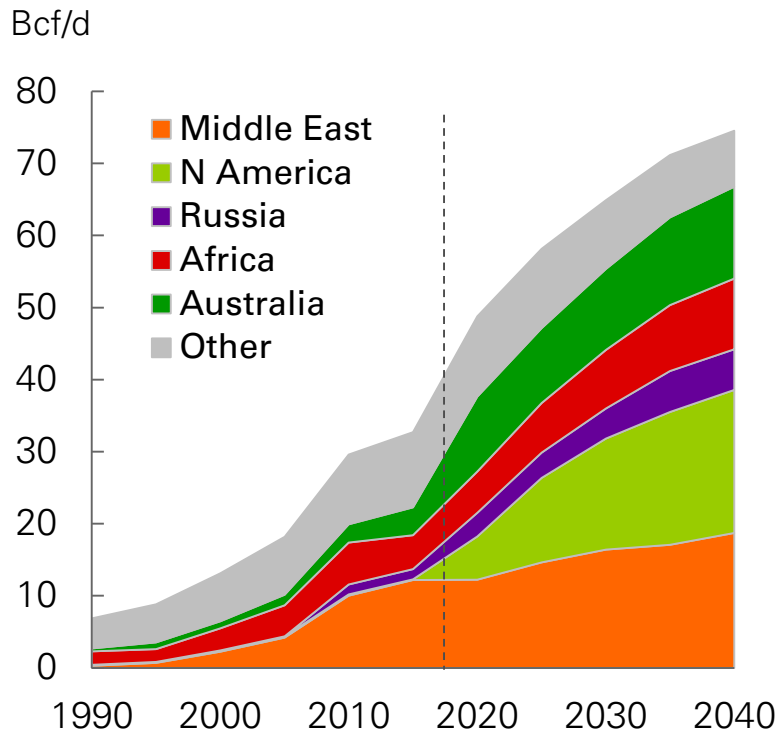


Possible risks to the outlook for natural gas

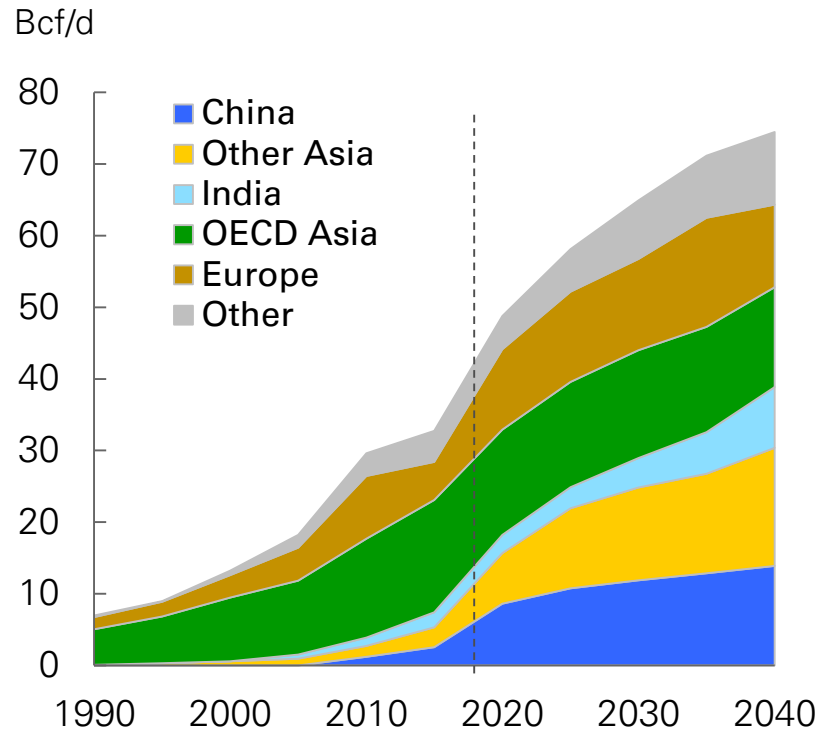


LNG continues to grow

LNG exports



LNG imports

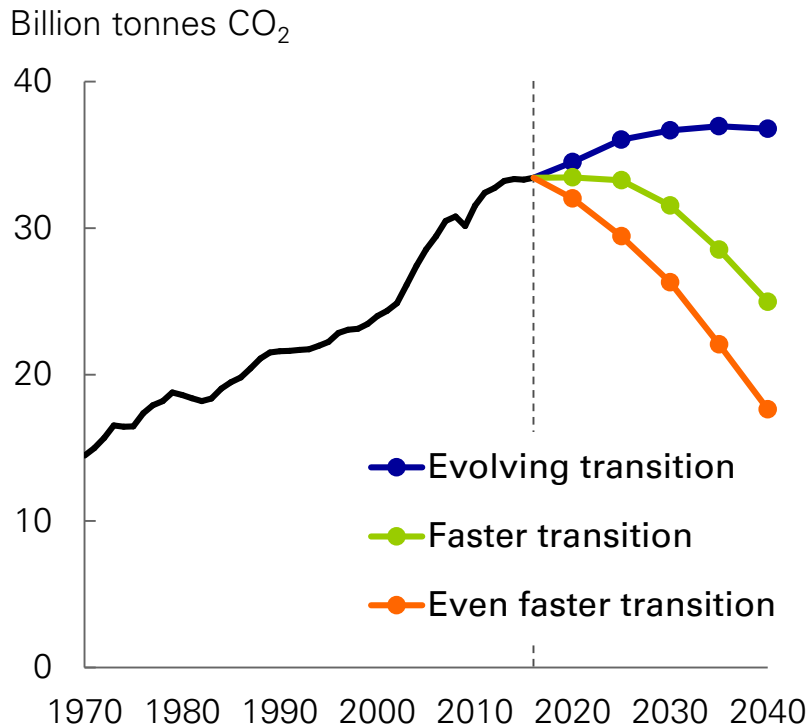


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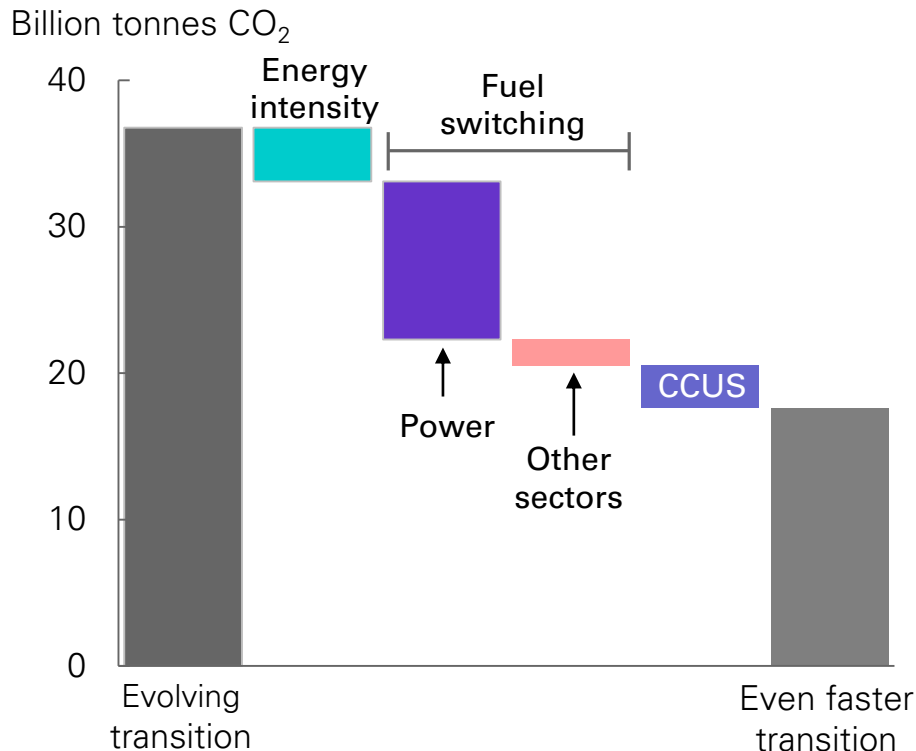
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Carbon emissions continue to rise in the ET scenario

Carbon emissions



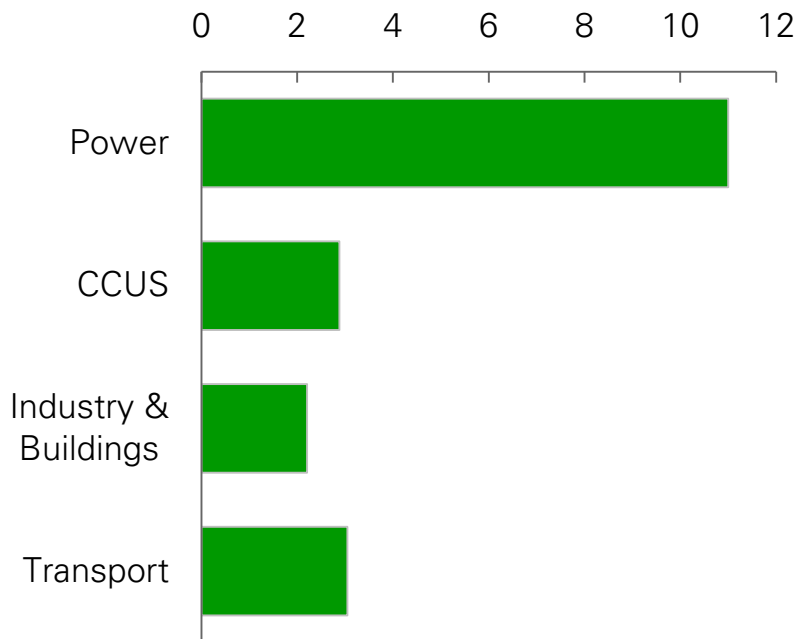
Carbon emissions in 2040:
EFT versus ET scenario



Impact of faster transition on global energy system

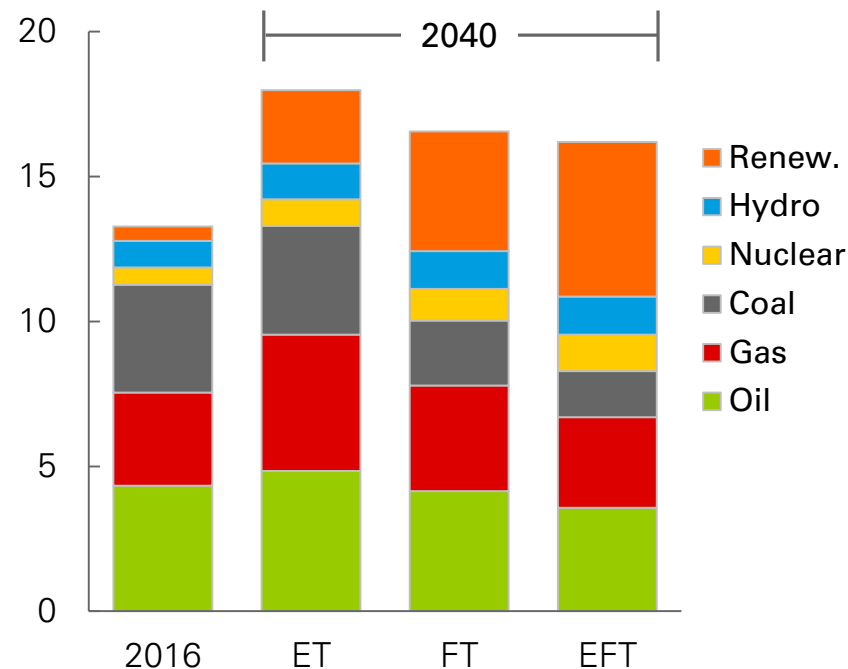
Reductions in carbon emissions:
EFT versus ET scenario

Billion tonnes CO₂ in 2040



Primary energy consumption under
different scenarios

Billion toe

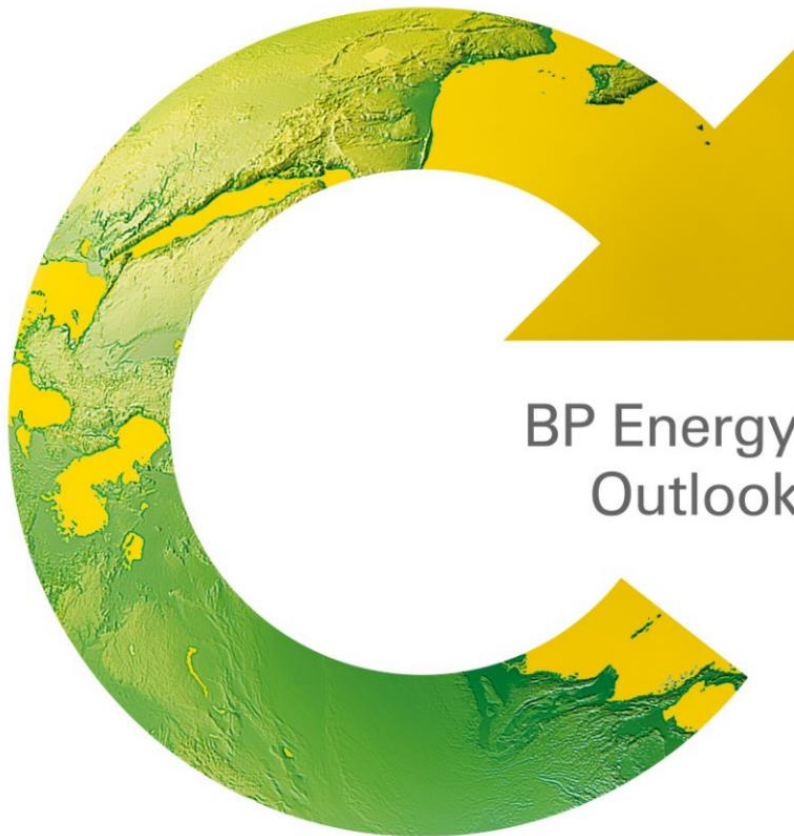


Conclusion

- Some aspects of energy transition seem relatively likely:
 - global energy demand continues to grow – driven by increasing prosperity
 - slower growth as we learn to do more with less
 - increasing abundance and diversification of energy supplies
 - renewable energy growing in importance
 - oil and gas continue to play a central role in the global energy system
- Other aspects remain far more uncertain:
 - impact of EVs and autonomy in reshaping transport sector
 - role of natural gas and renewables in lower carbon transition
 - how will we achieve a more decisive break from past to achieve sharp fall in carbon emissions?

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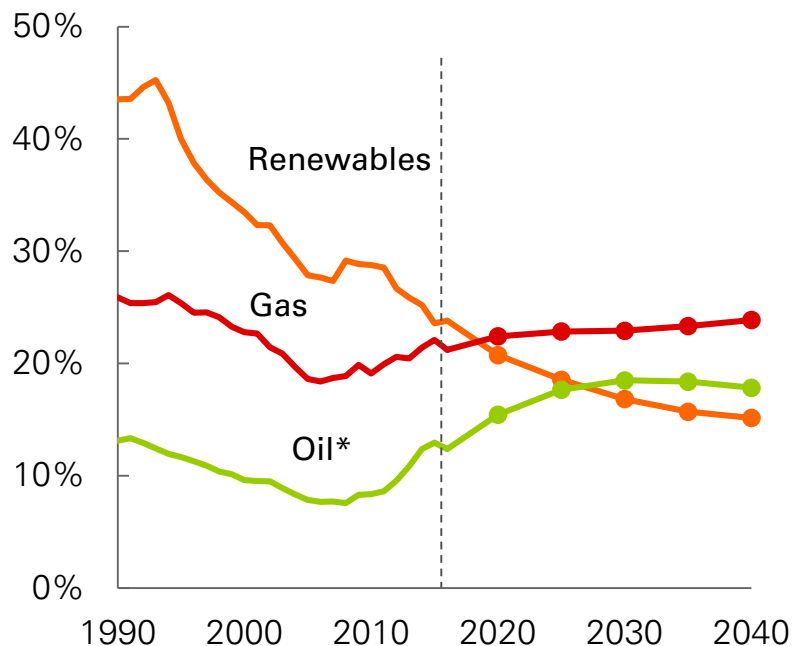
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Mark Finley
General manager

The role of US in global energy markets



US shares of global production



* Includes crude and NGLs

Regional oil/gas imbalances

