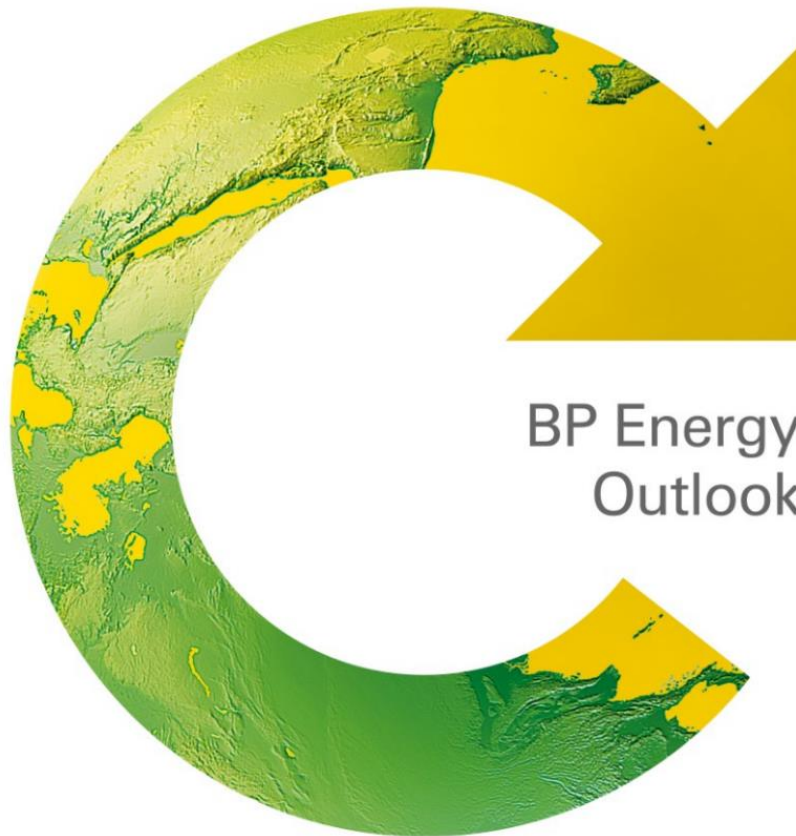




# BP Energy Outlook

2018 edition



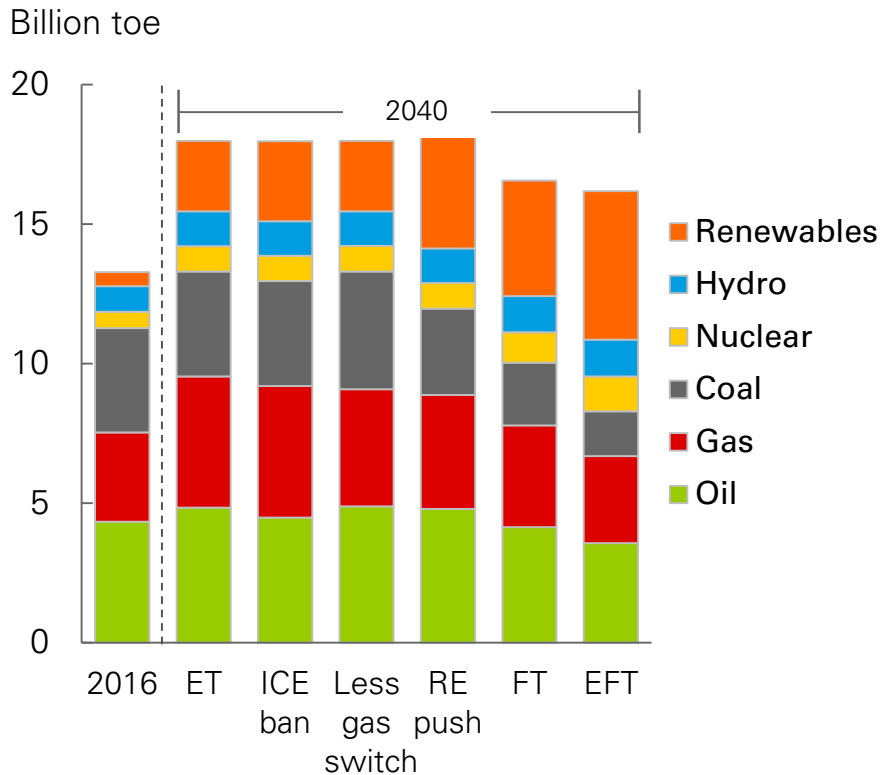
BP Energy Outlook | 2018 edition

**Spencer Dale**  
Group chief economist

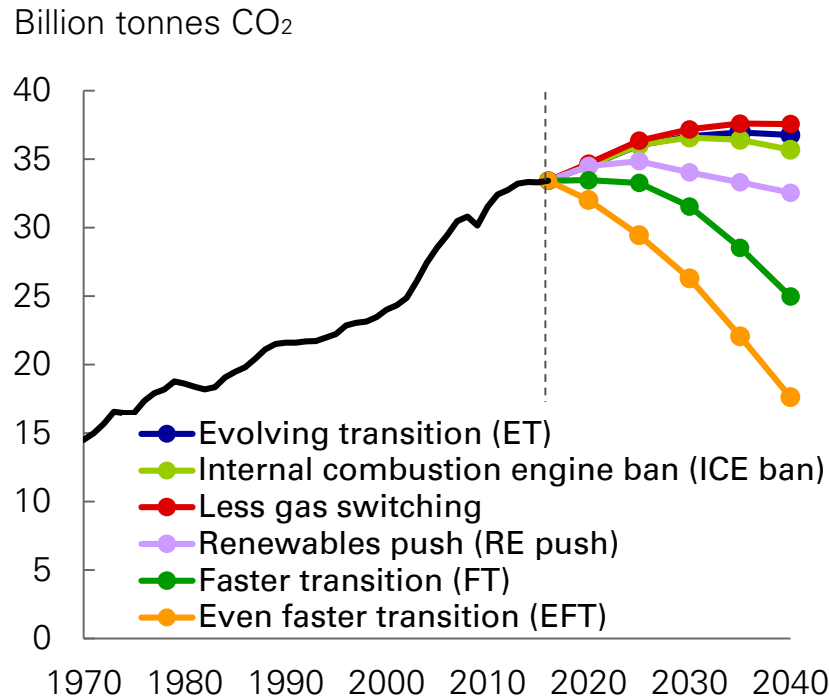
# Alternative scenarios



## Primary energy consumption by fuel



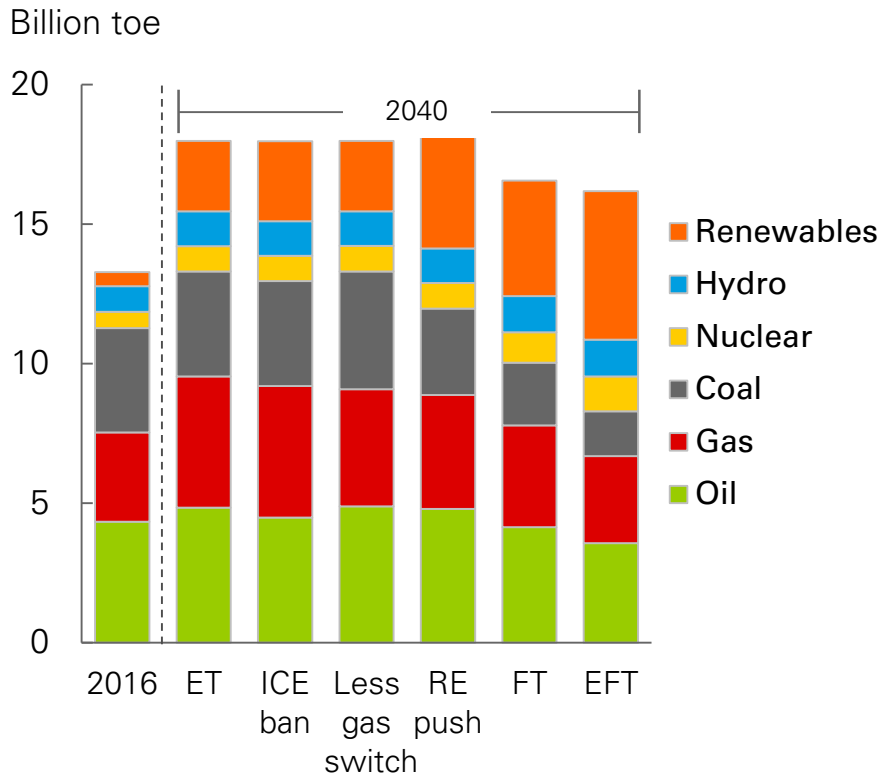
## Carbon emissions



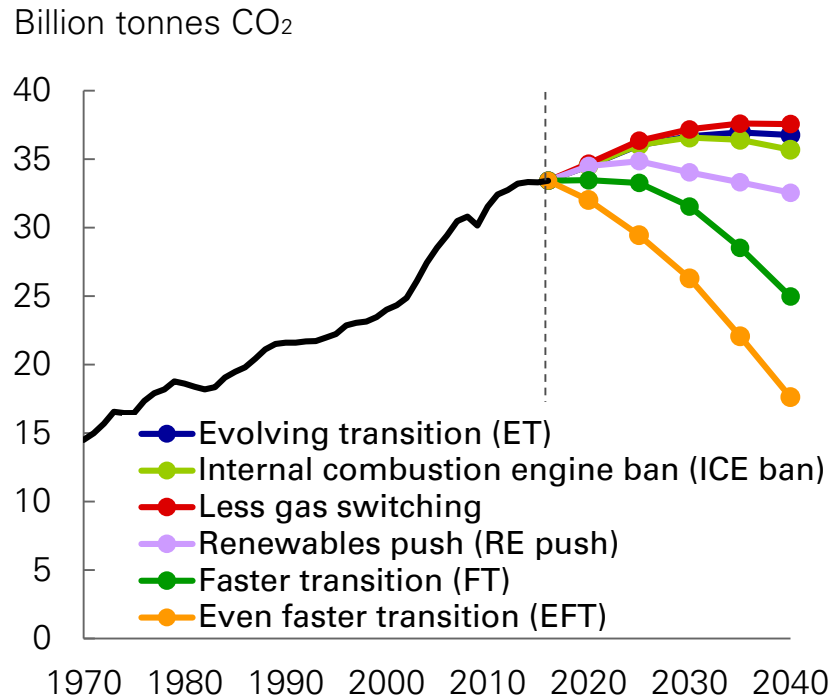
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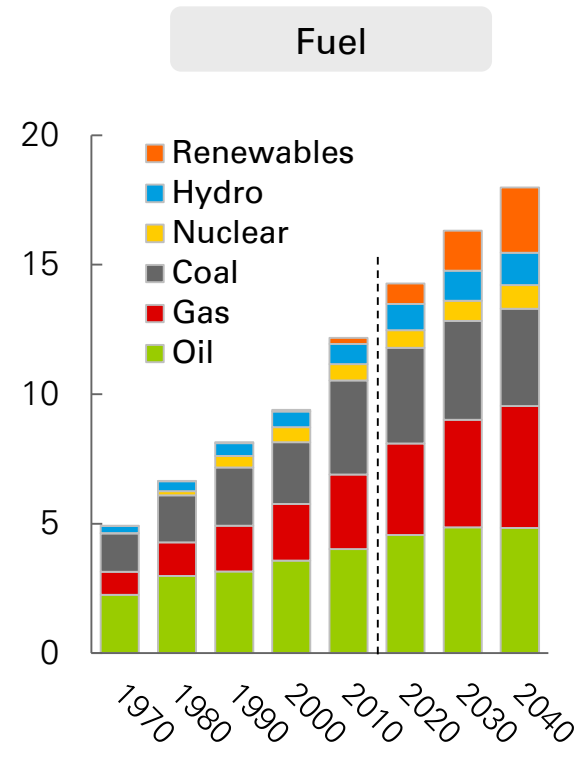
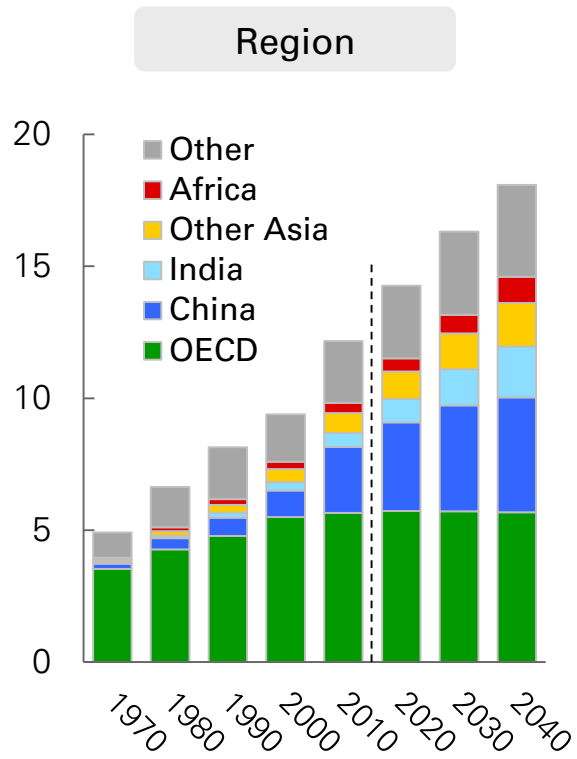
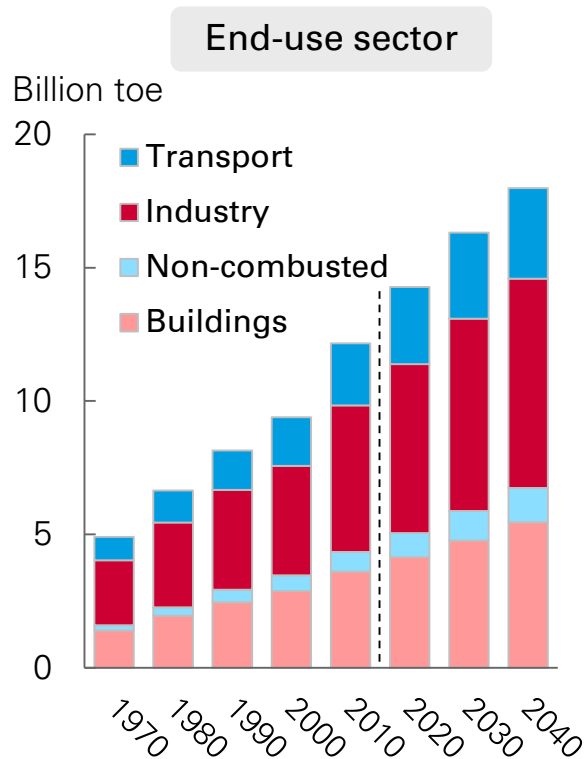


## Carbon emissions



# Three windows on the energy transition

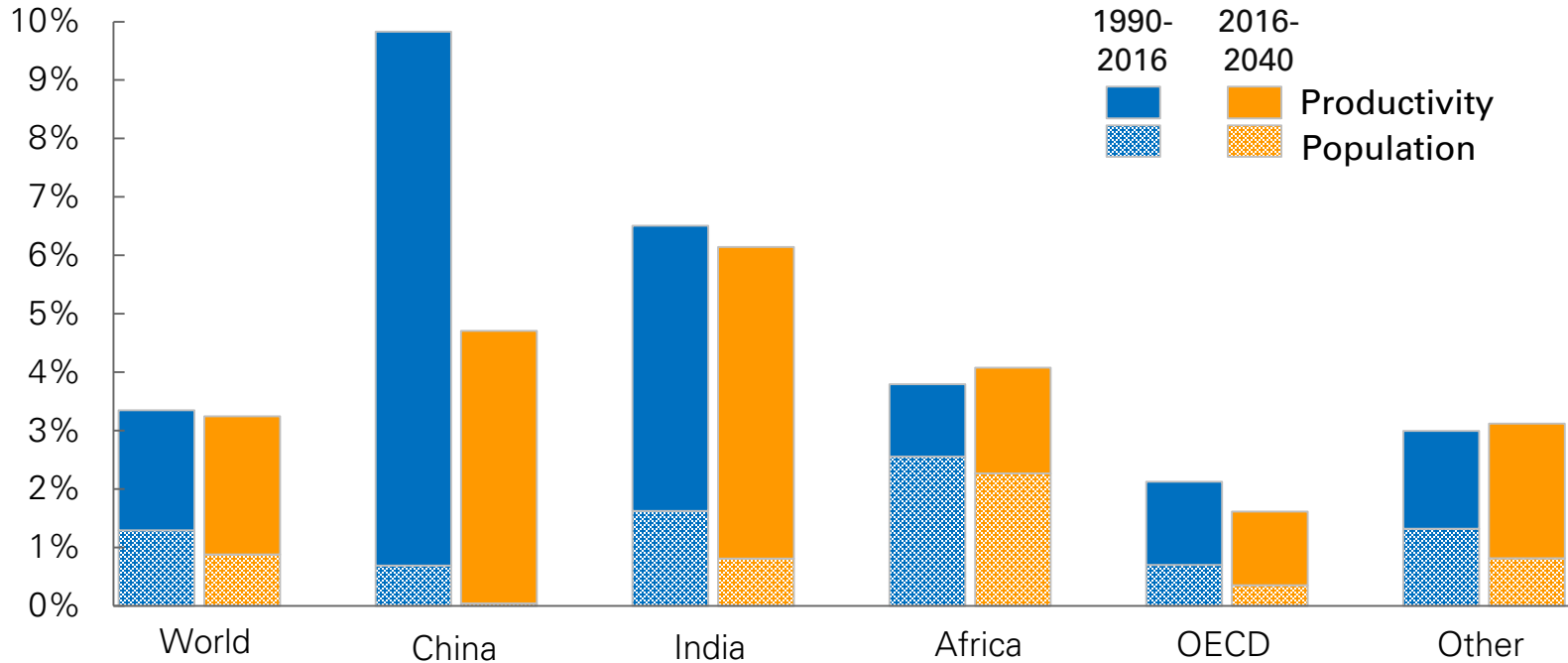
## Primary energy demand



# Economic backdrop

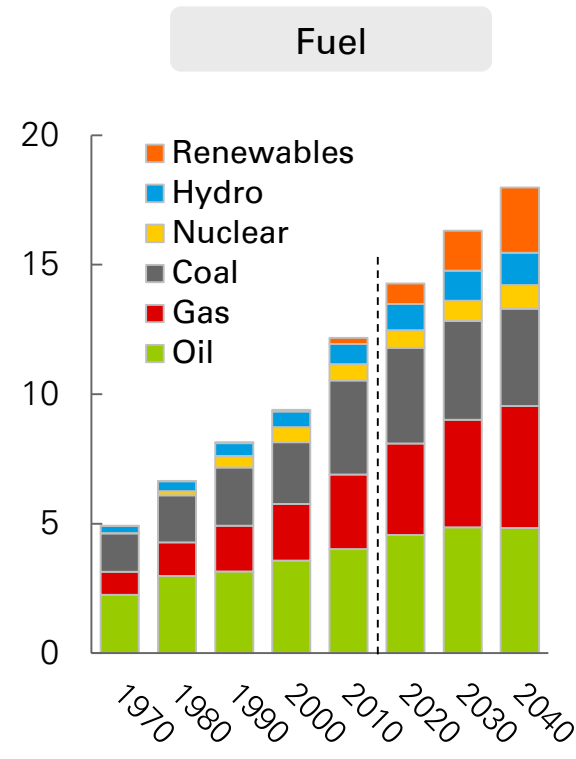
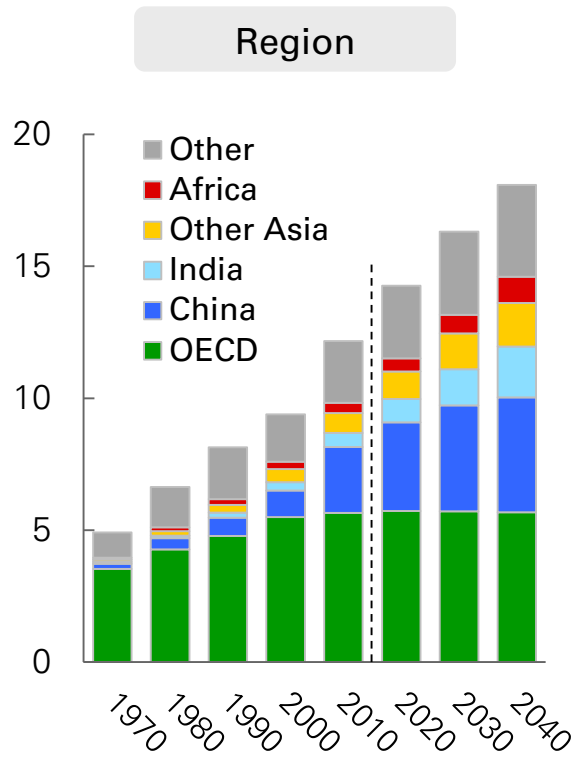
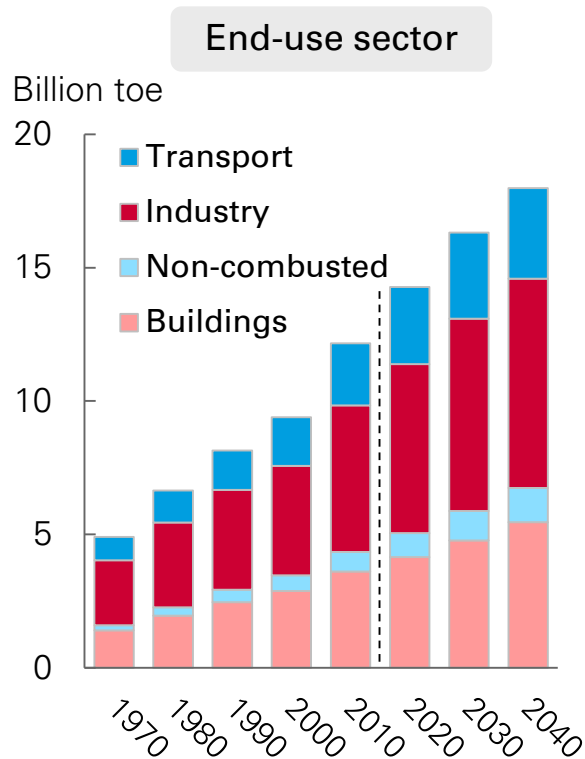
## GDP growth by region and factor

% per annum



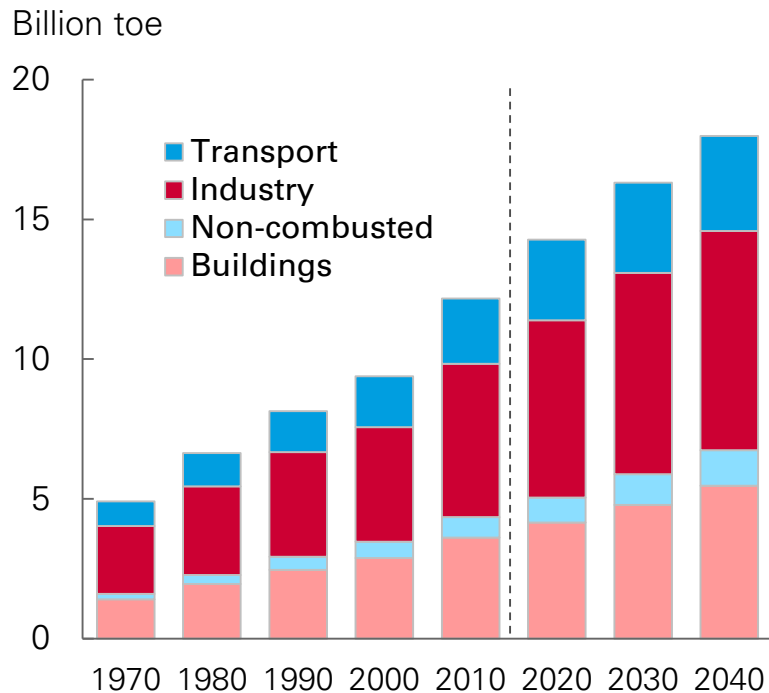
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## Primary energy demand

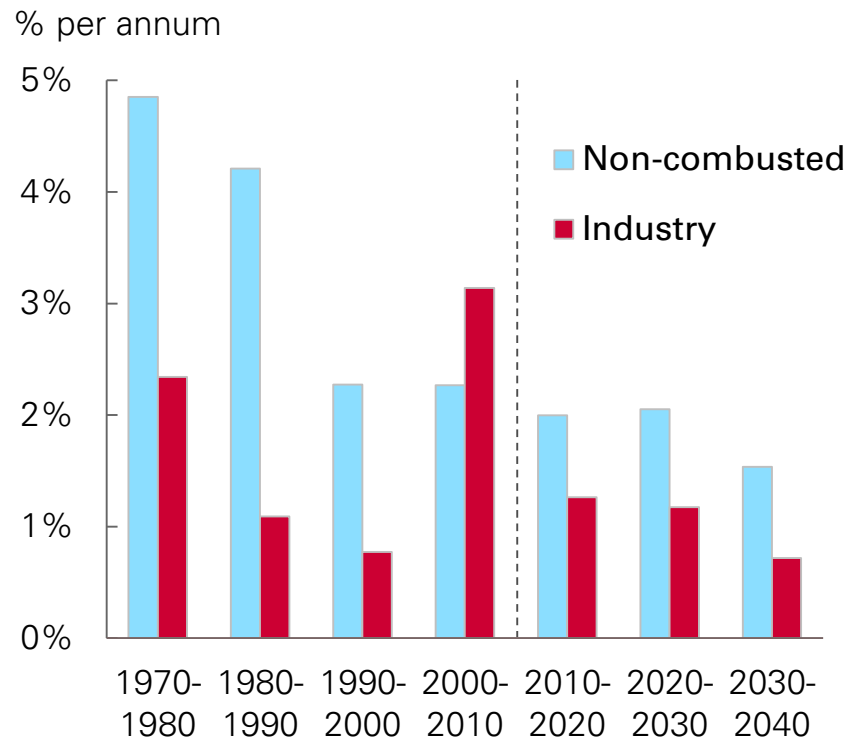


# Energy demand by sector

## Primary energy consumption by end use sector

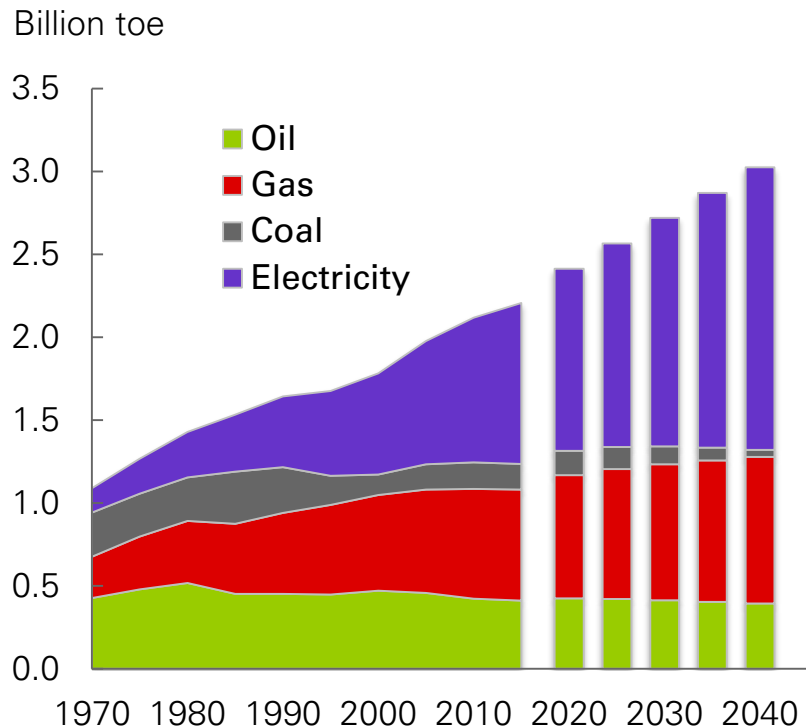


## Final energy consumption growth: non-combusted versus industry



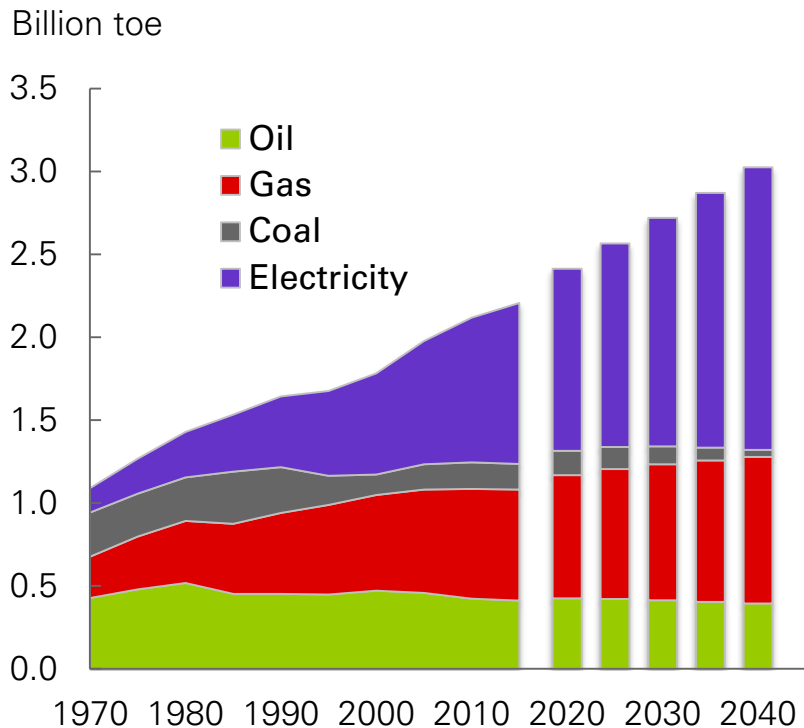
# Energy demand in buildings

Final energy consumption in buildings  
by fuel type

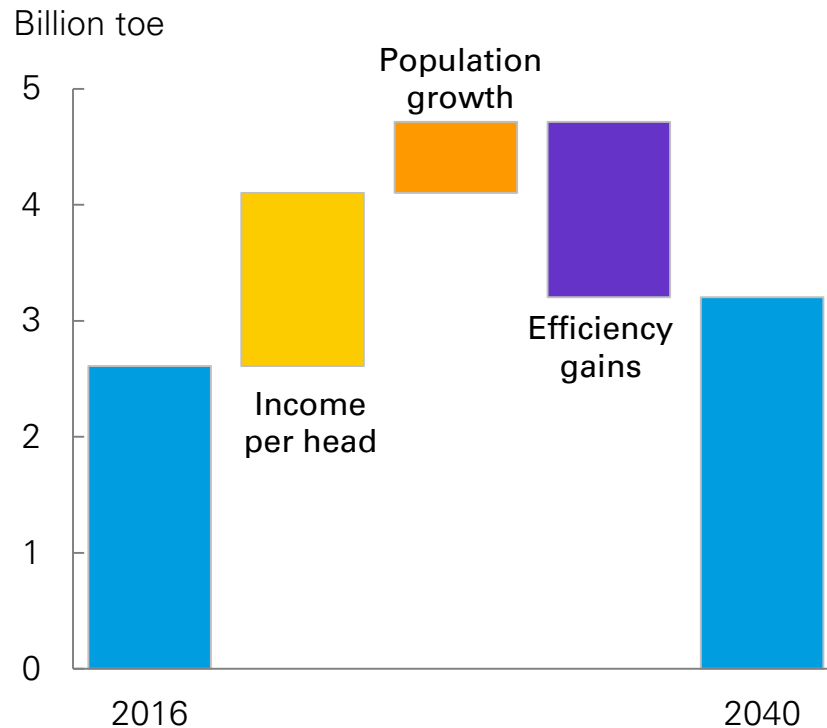


# Energy demand in buildings and transport sector

## Final energy consumption in buildings by fuel type

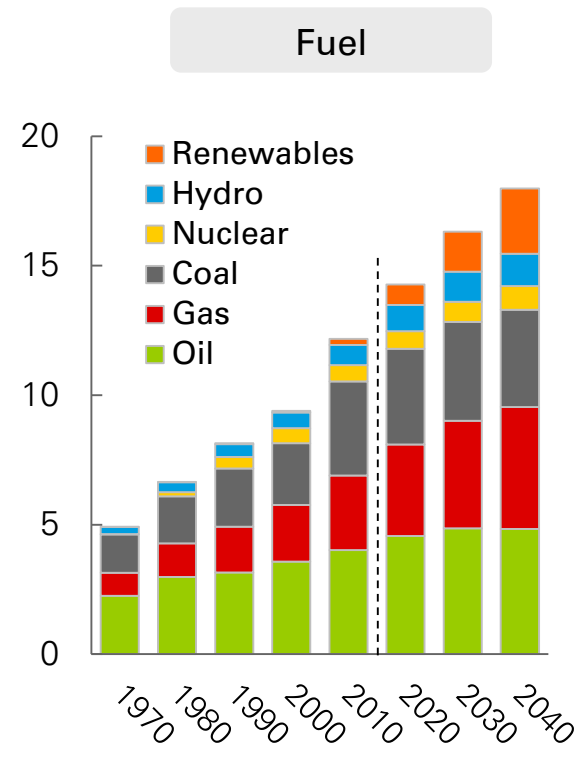
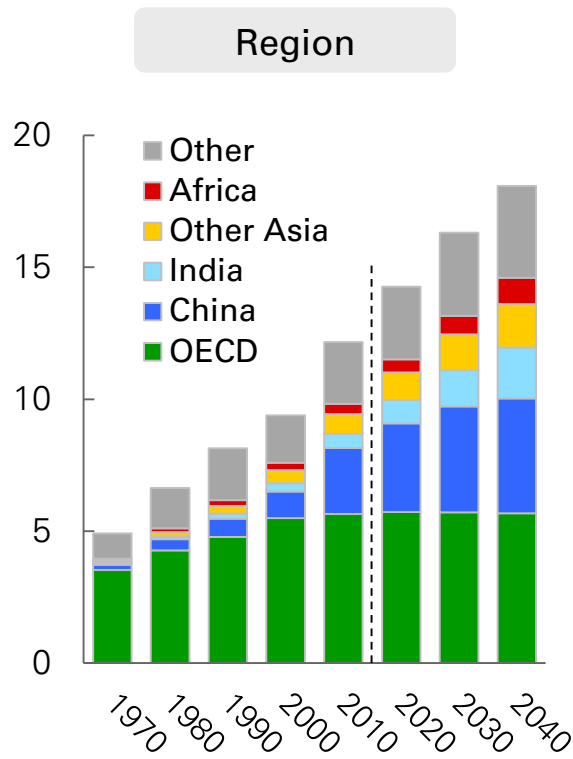
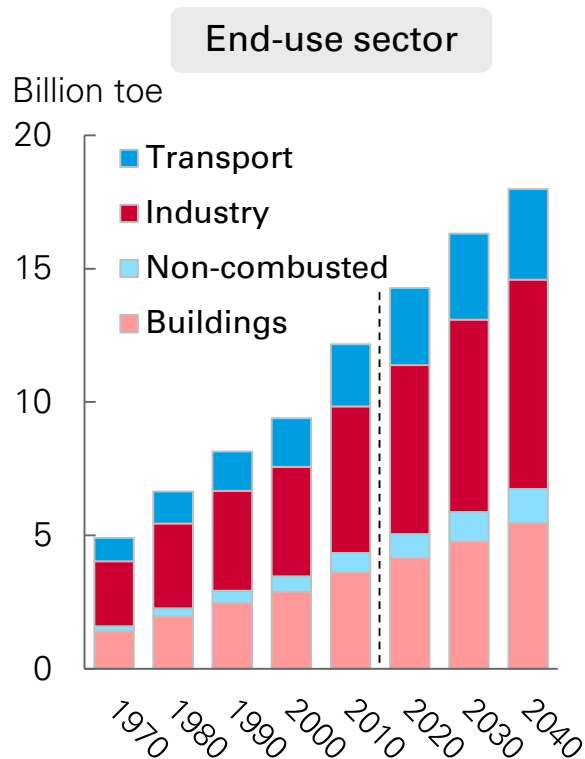


## Contributions to transport energy consumption growth



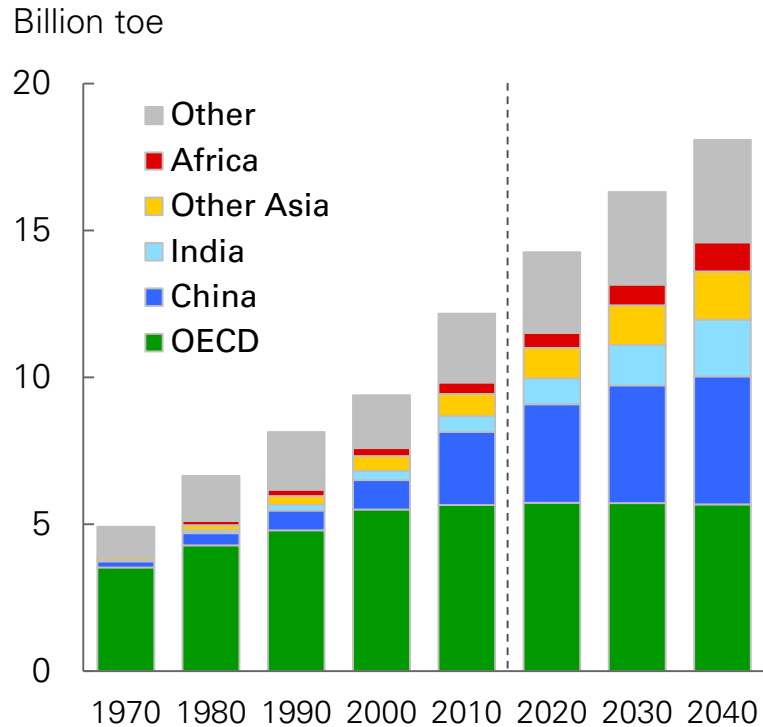
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## Primary energy demand

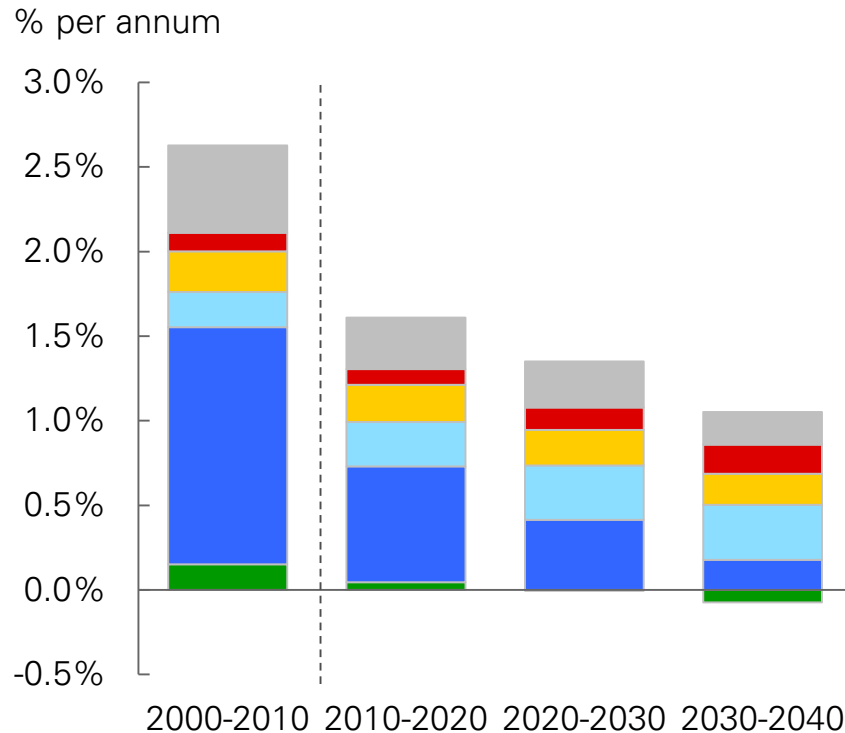


# Regional energy demand

## Primary energy consumption by region



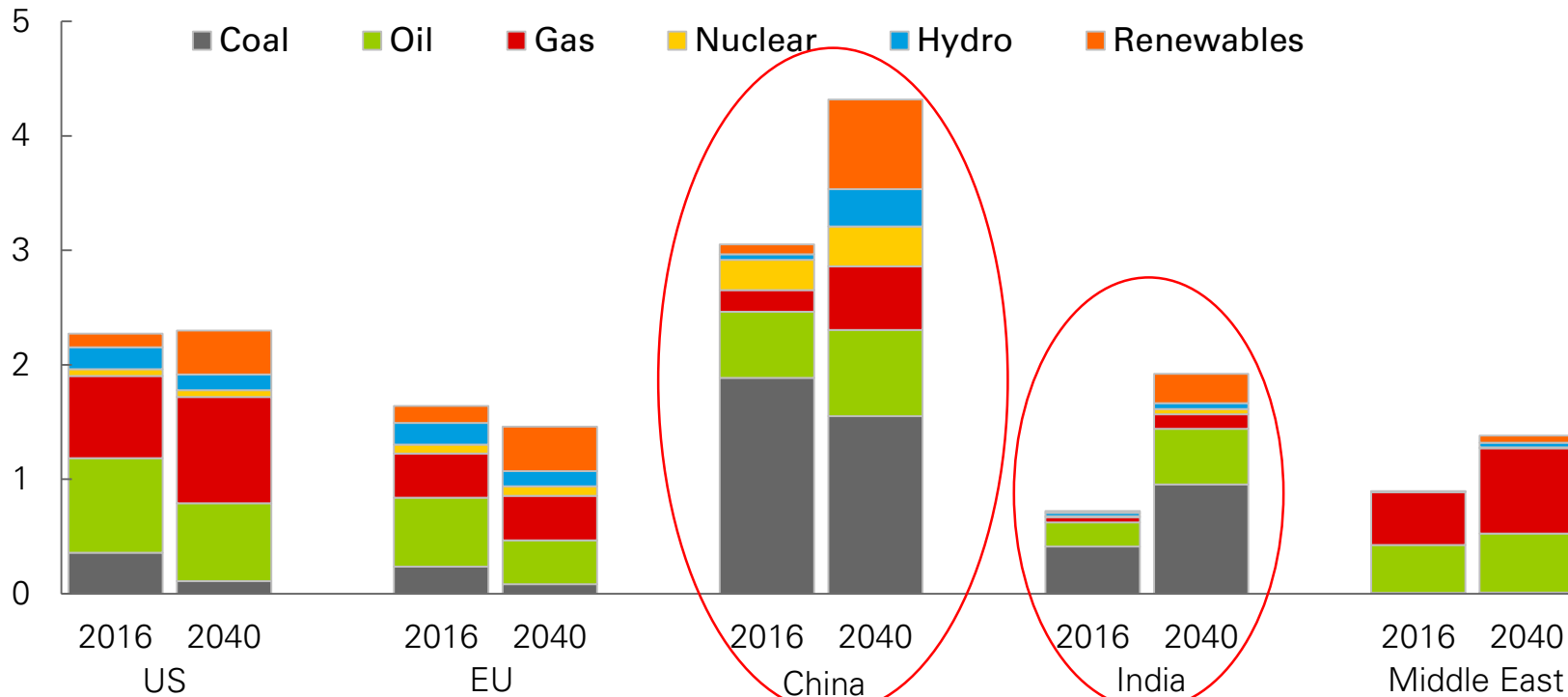
## Primary energy growth and regional contributions



# Energy mix by region

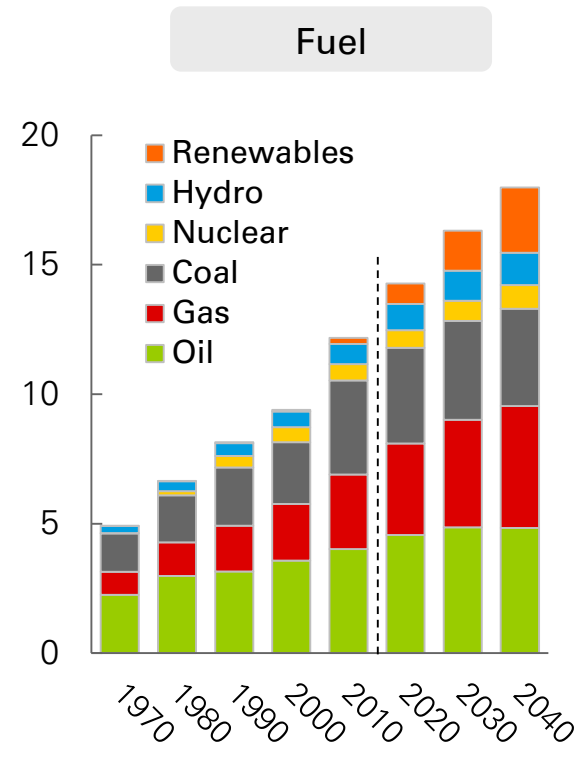
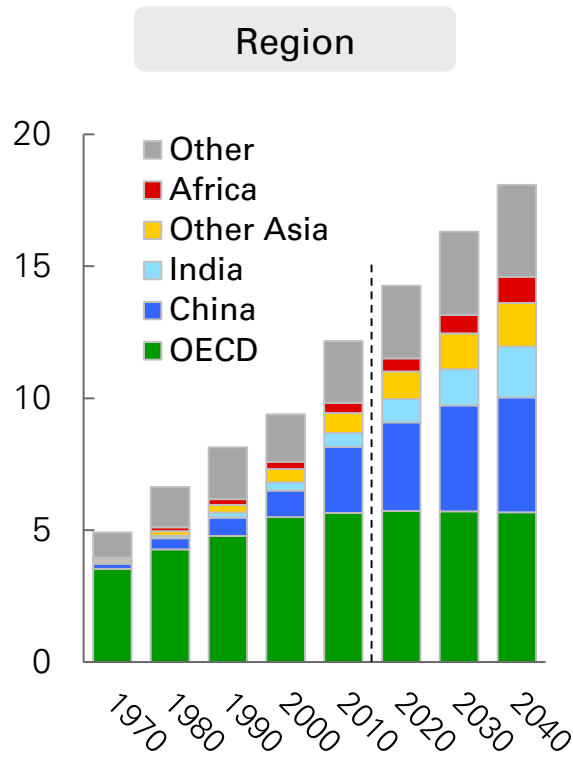
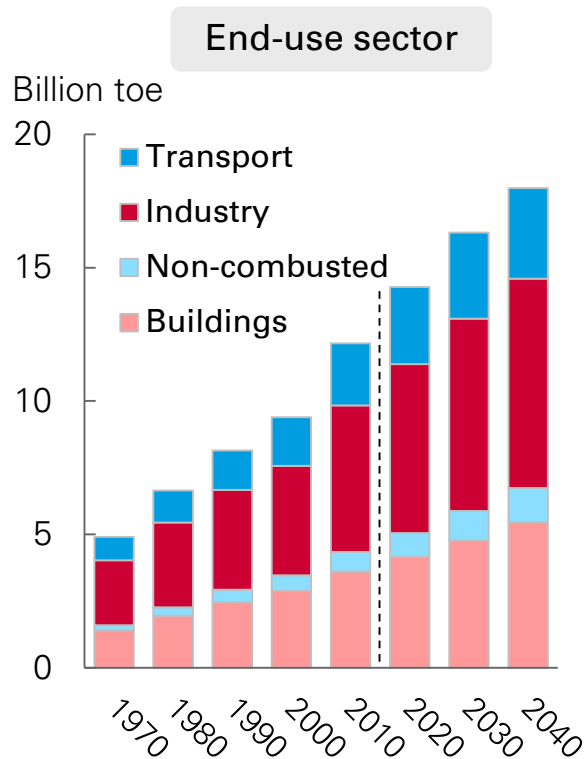
## Primary energy demand by fuel and region

Billion toe



# Three windows on the energy transition

## Primary energy demand

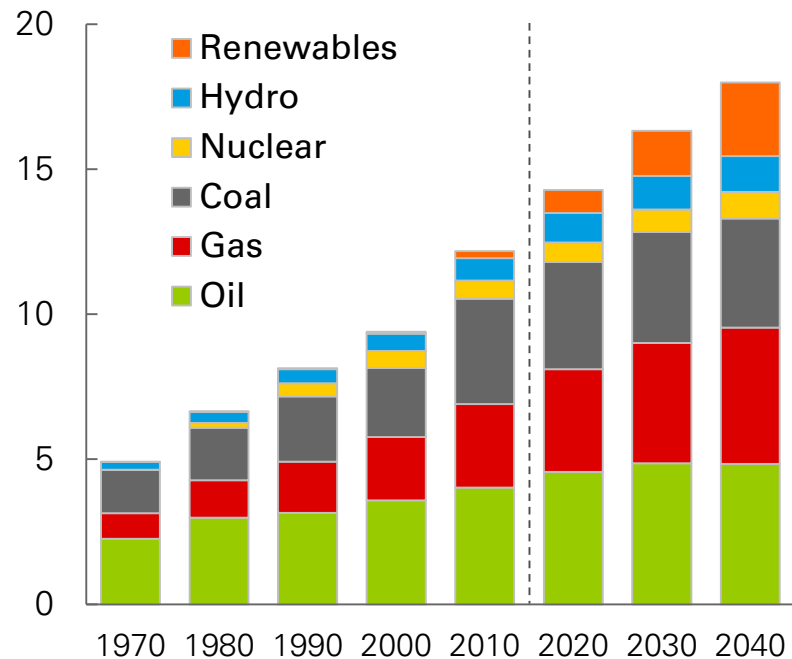


# Global energy by fuel

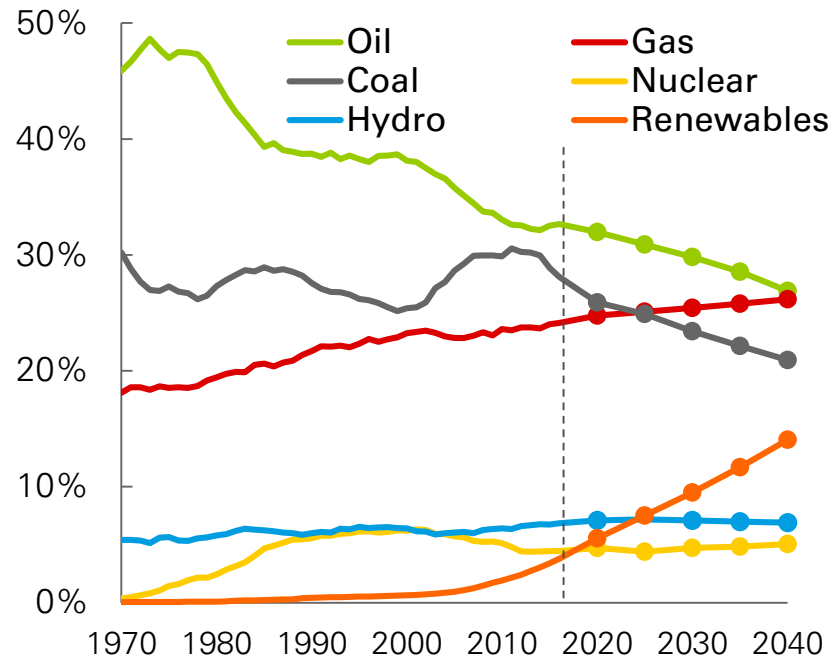


## Primary energy consumption by fuel

Billion toe



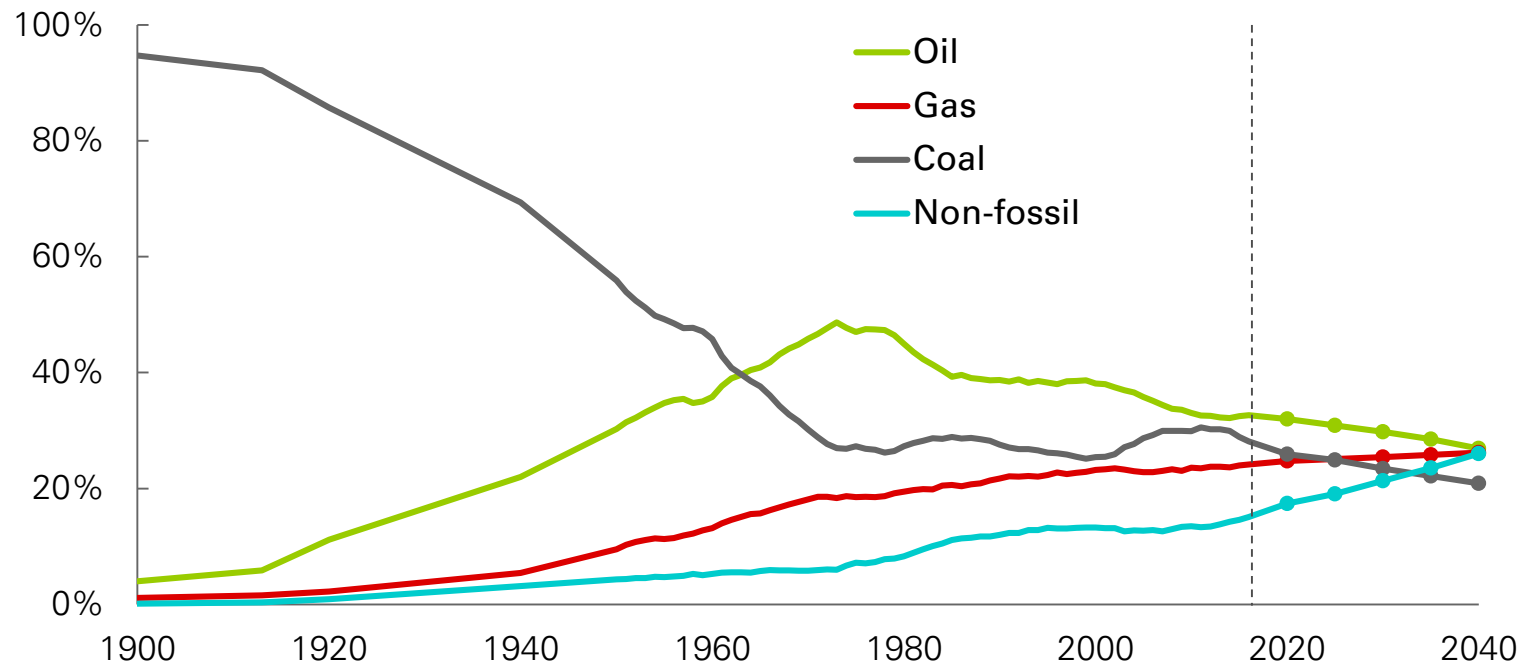
## Shares of primary energy



# Diversified fuel mix



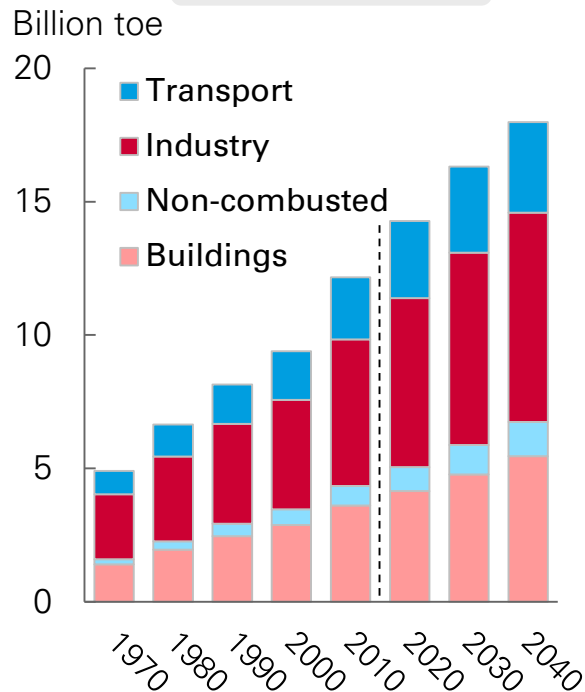
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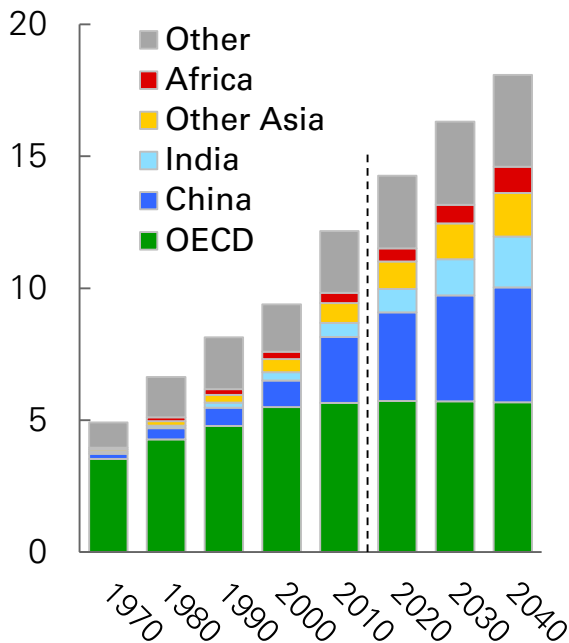
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## Primary energy demand

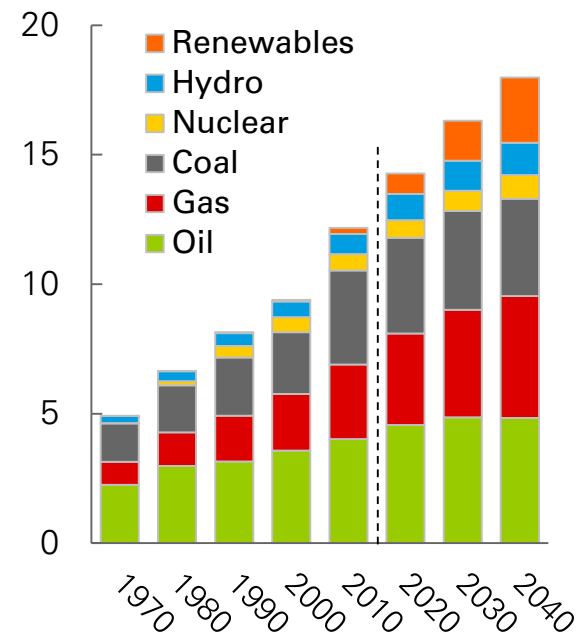
End-use sector



Region



Fuel



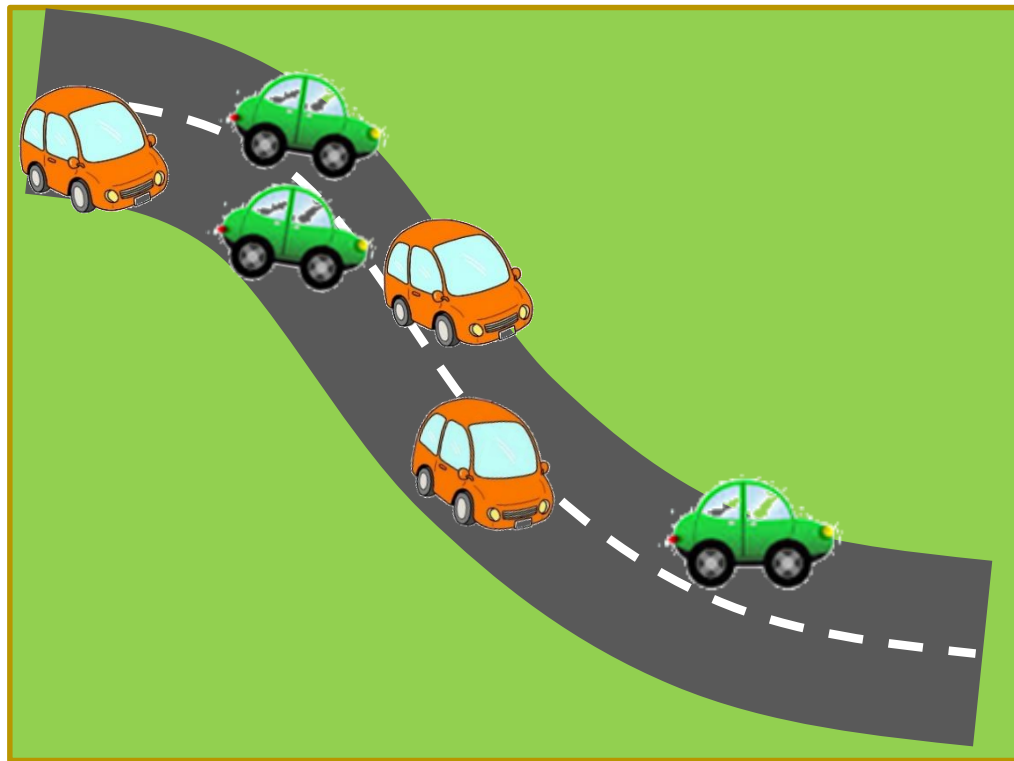
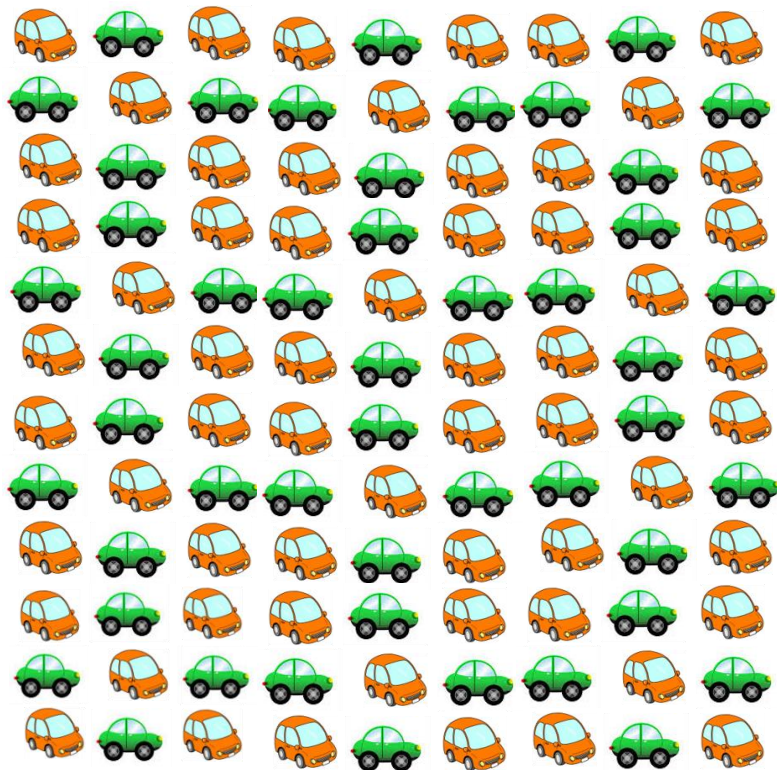
# Five key questions

- What have we learnt about electric cars and the mobility revolution?
- When is global oil demand likely to stop growing?
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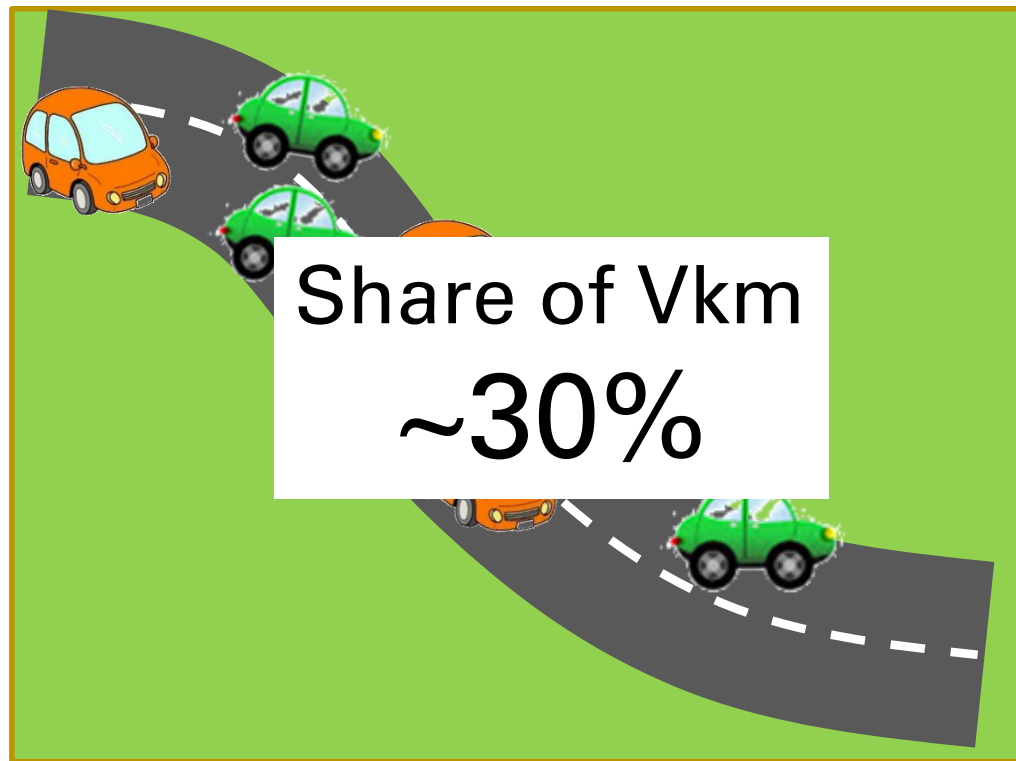
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# Penetration of electric cars in 2040



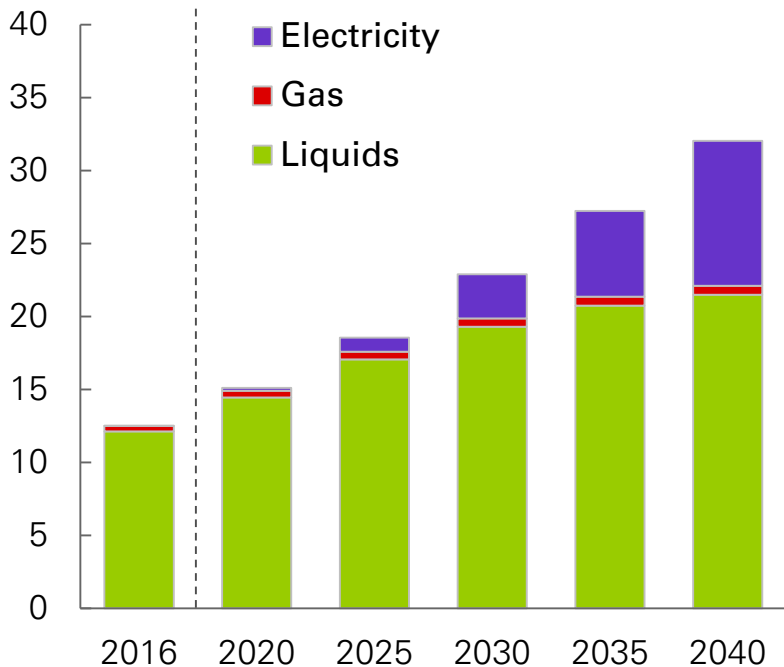
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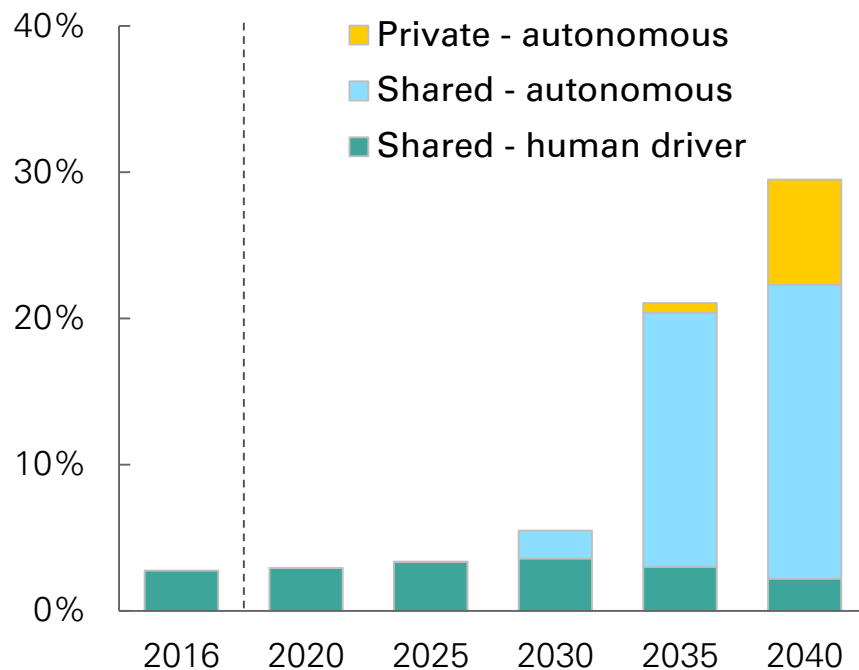
# Electric cars, shared mobility and autonomy

## Car kilometres by fuel type

Trillion km

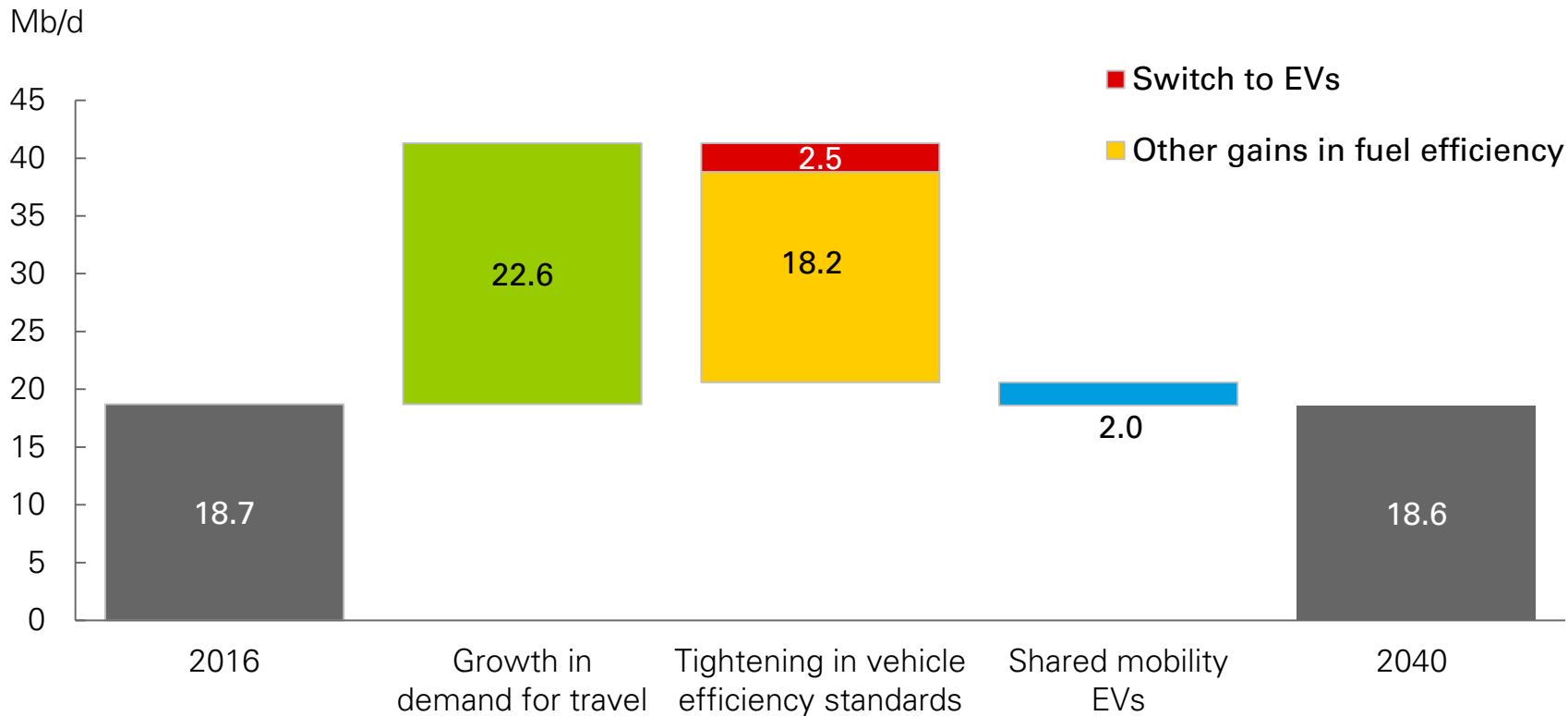


## New mobility share of Vkm



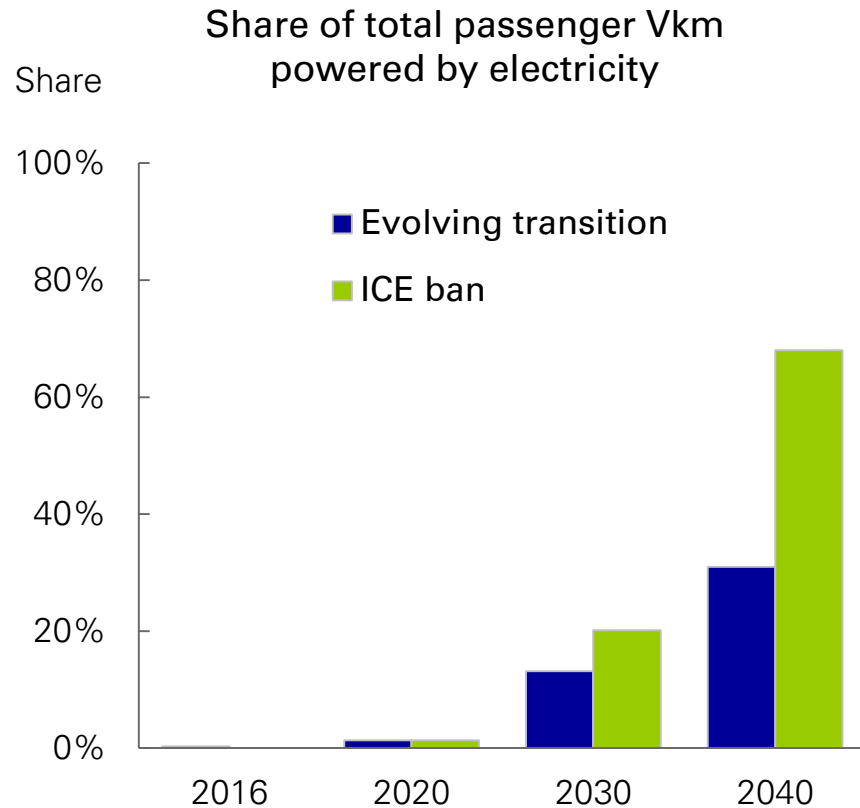
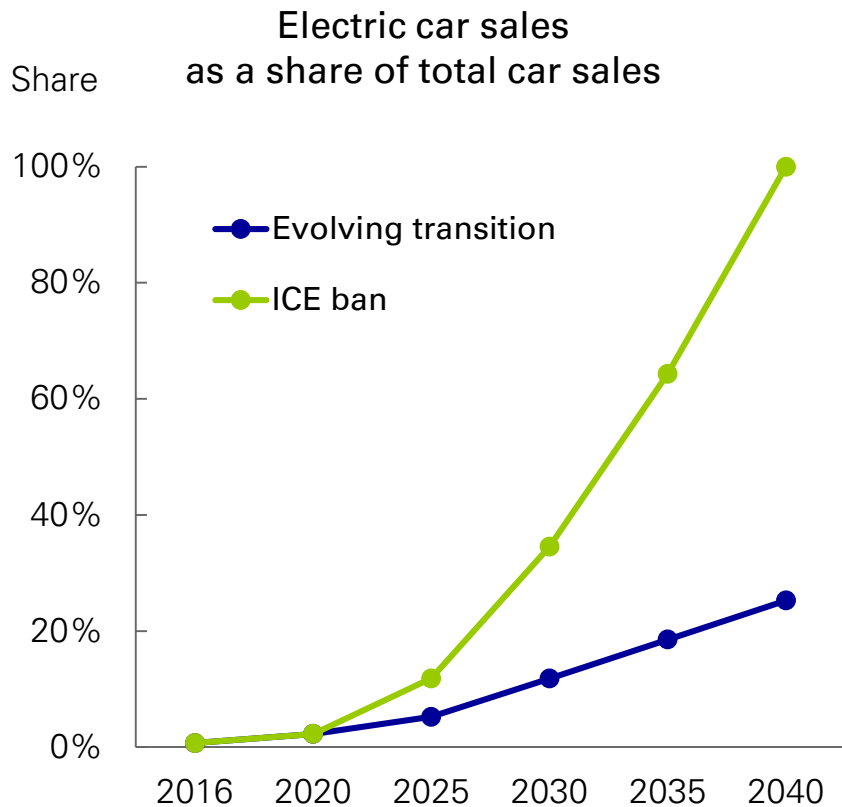
# Liquid fuel demand from passenger cars

Changes in liquids demand from cars: 2016-2040



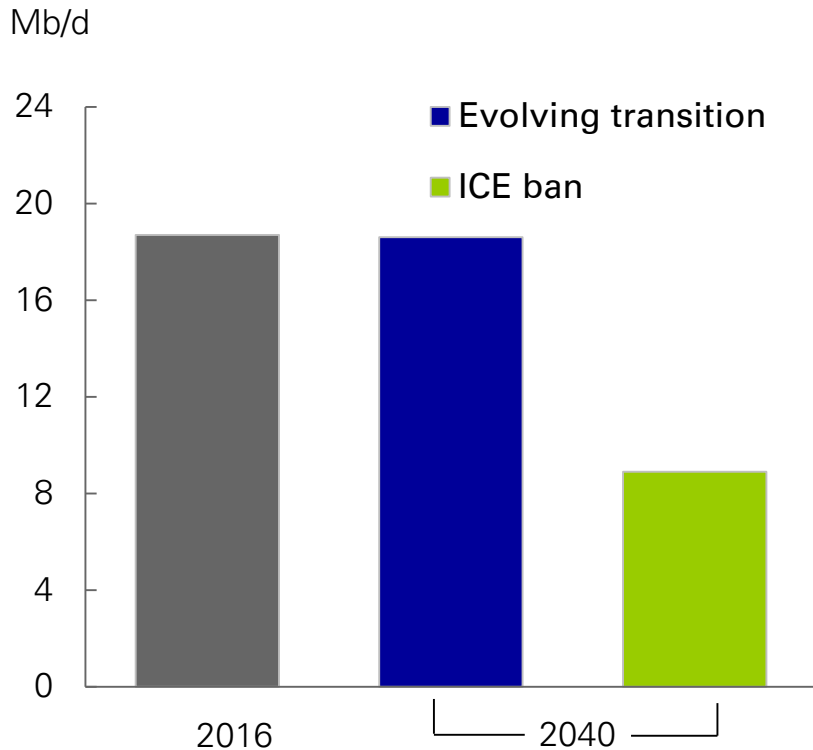


# Global ban on internal-combustion engine (ICE) cars

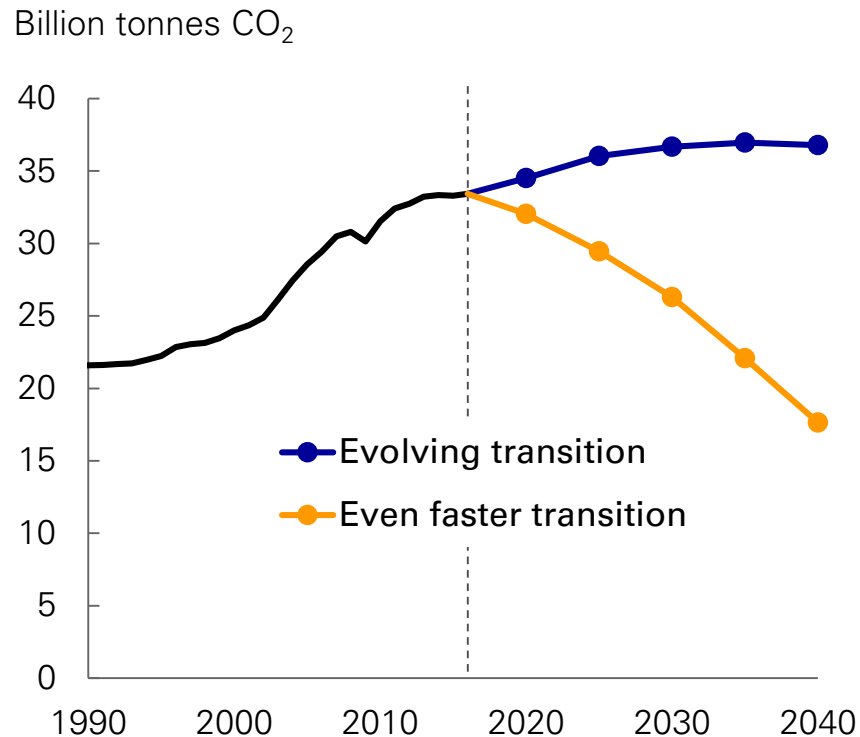


# Impact of ICE ban

## Passenger cars liquids demand

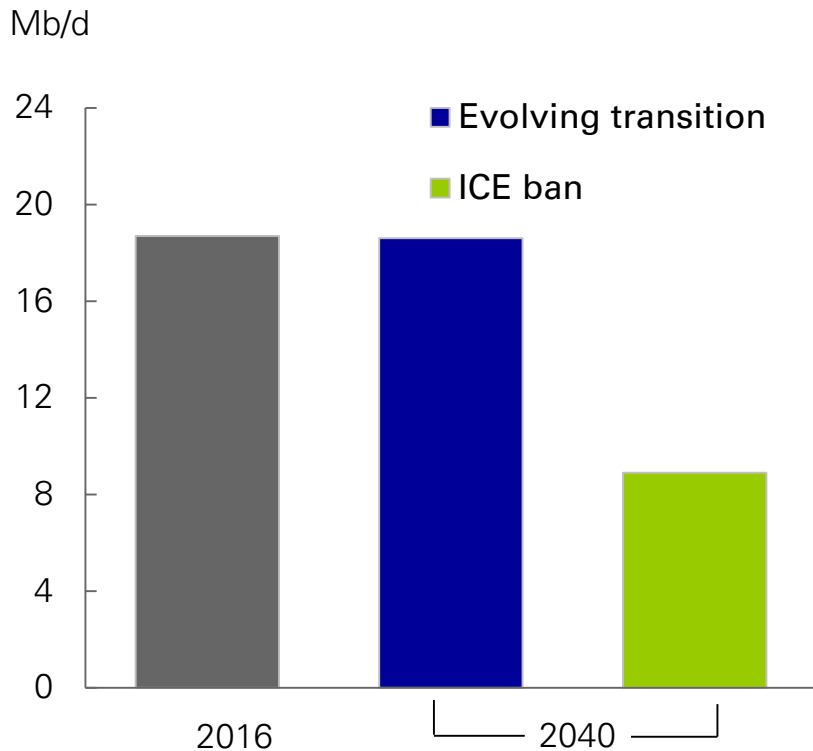


## Carbon emissions from energy

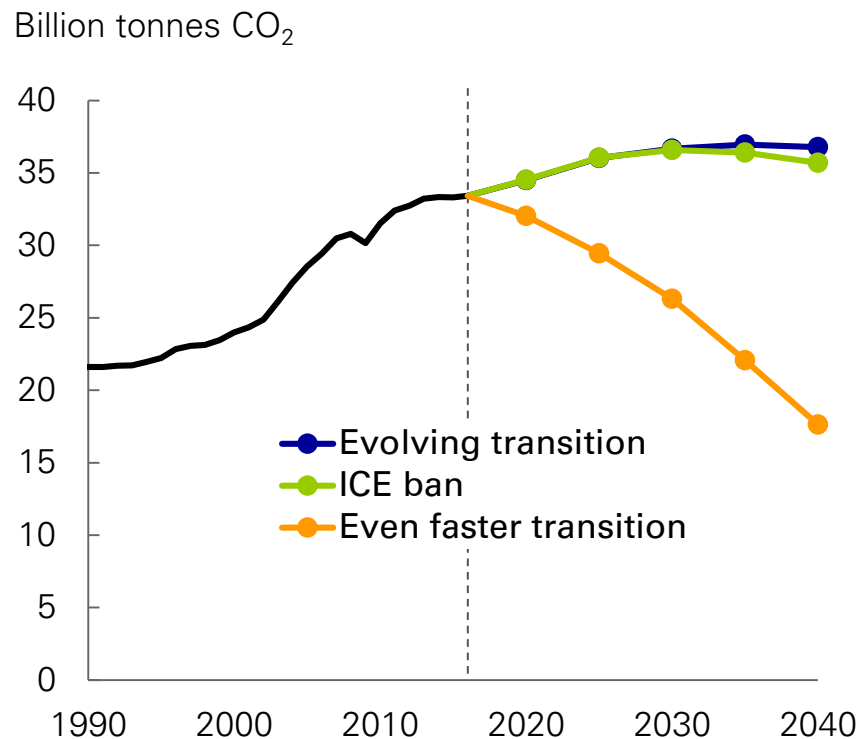


# Impact of ICE ban

## Passenger cars liquids demand



## Carbon emissions from energy

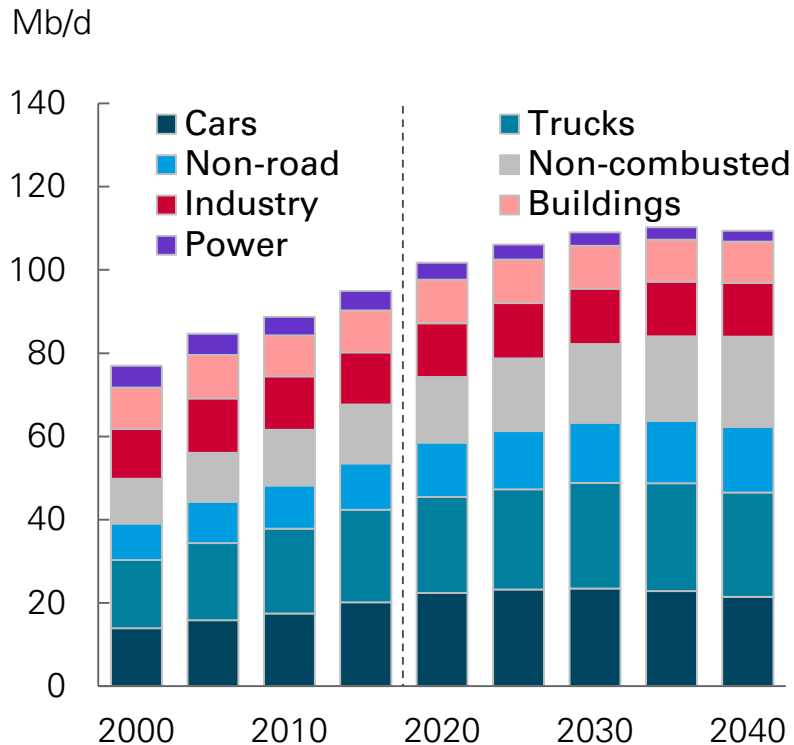


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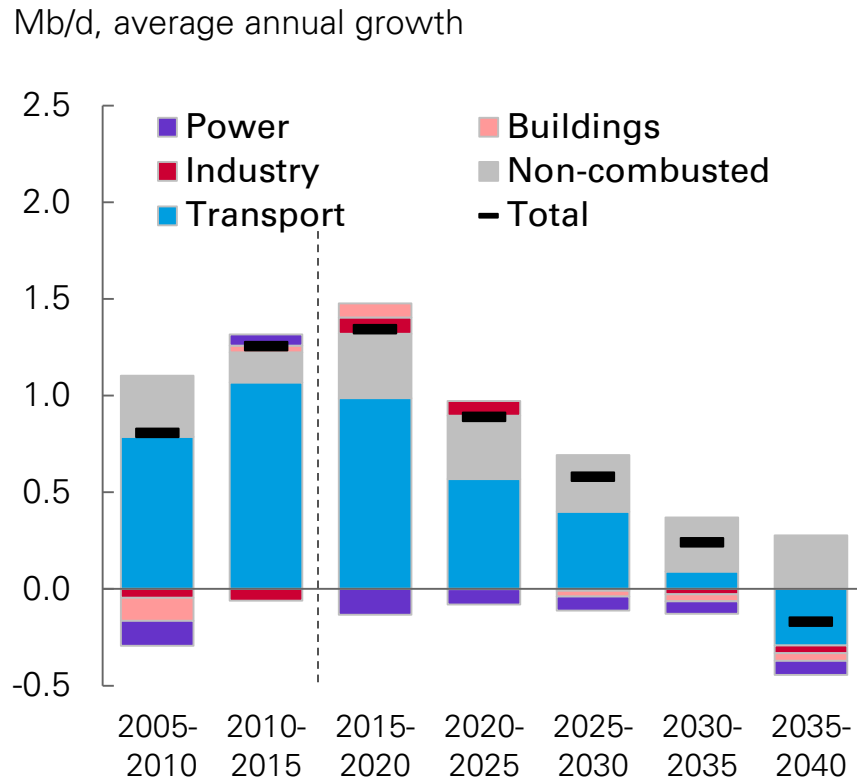
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# Demand for oil and other liquid fuels

## Liquids demand

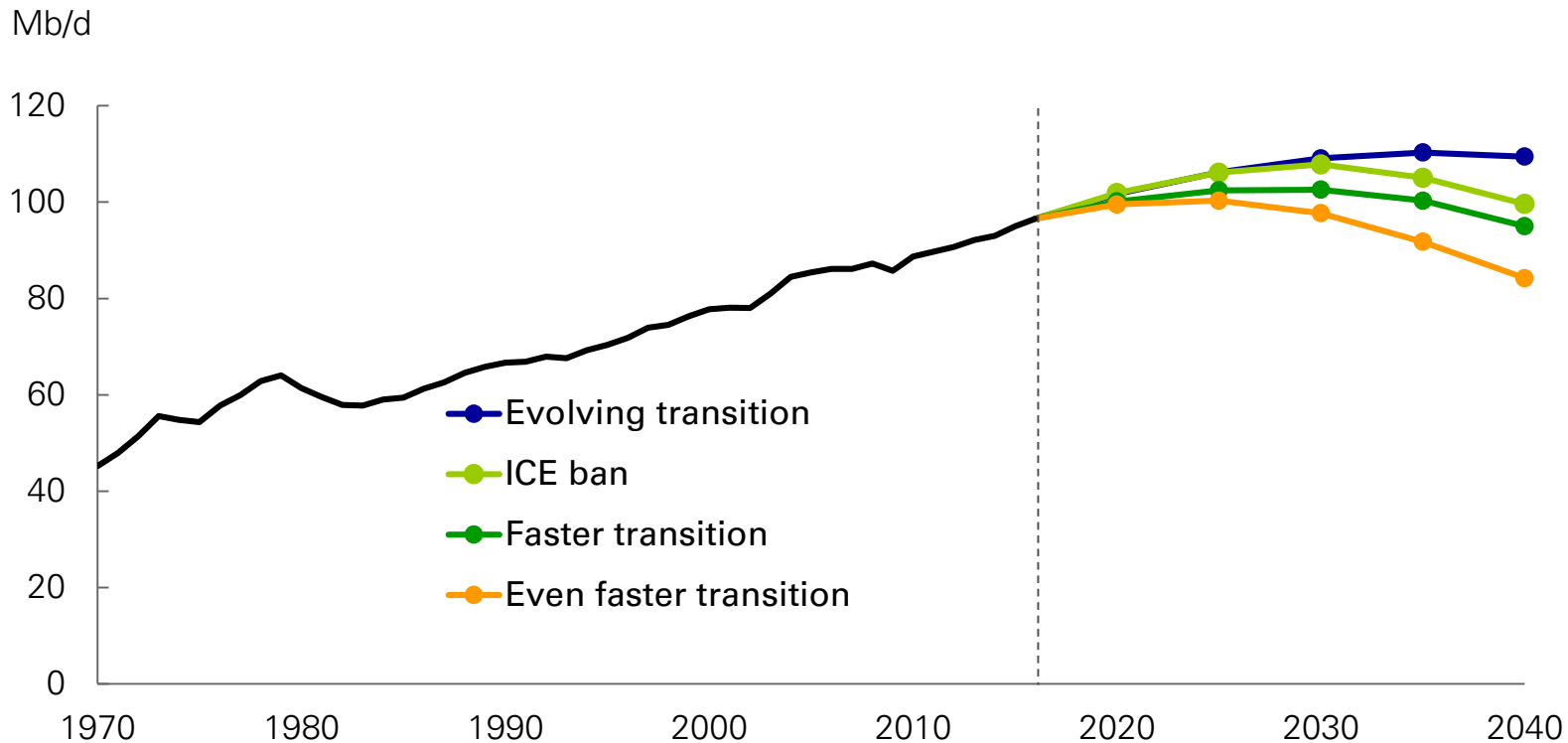


## Liquids demand growth



# Demand for oil and other liquid fuels

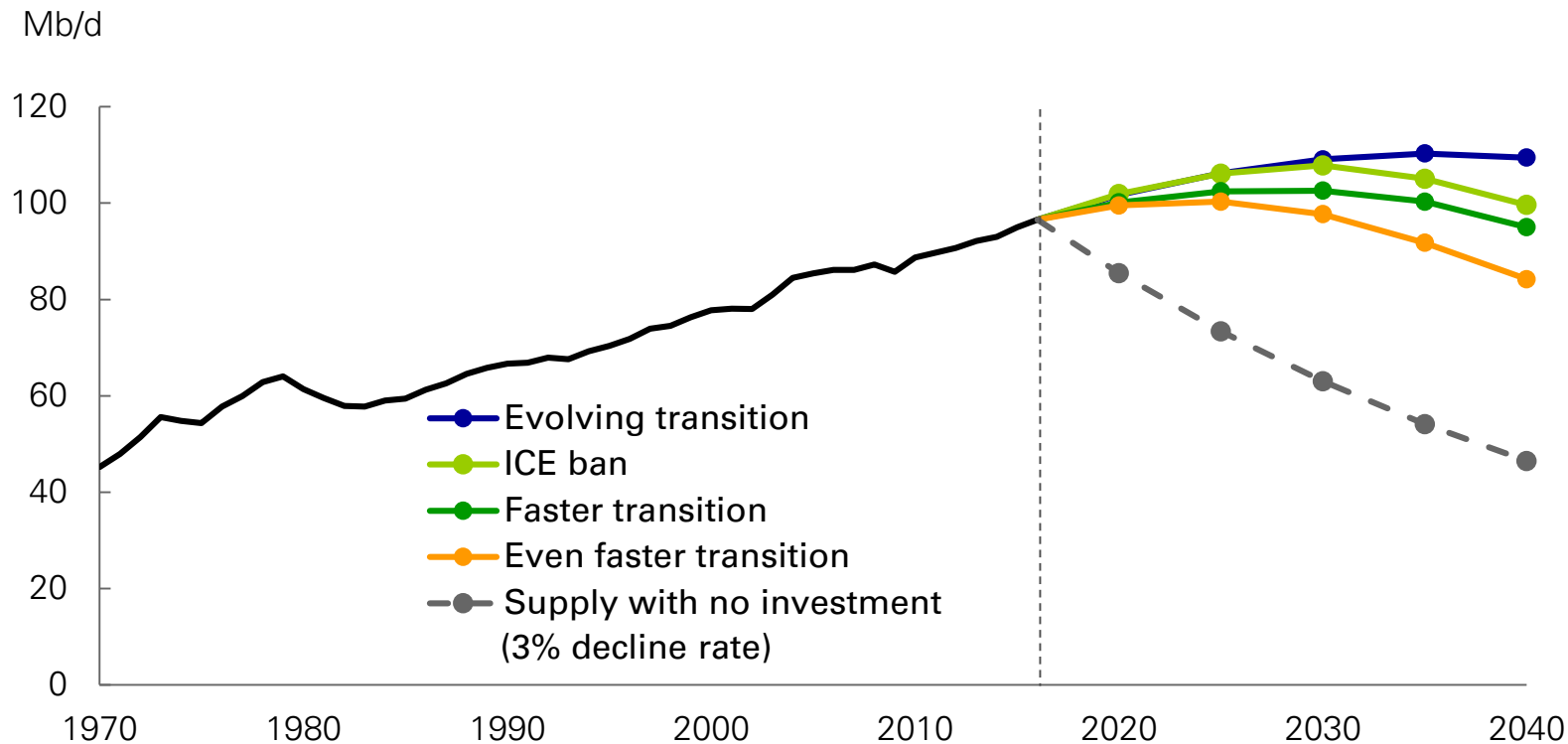
Liquids demand





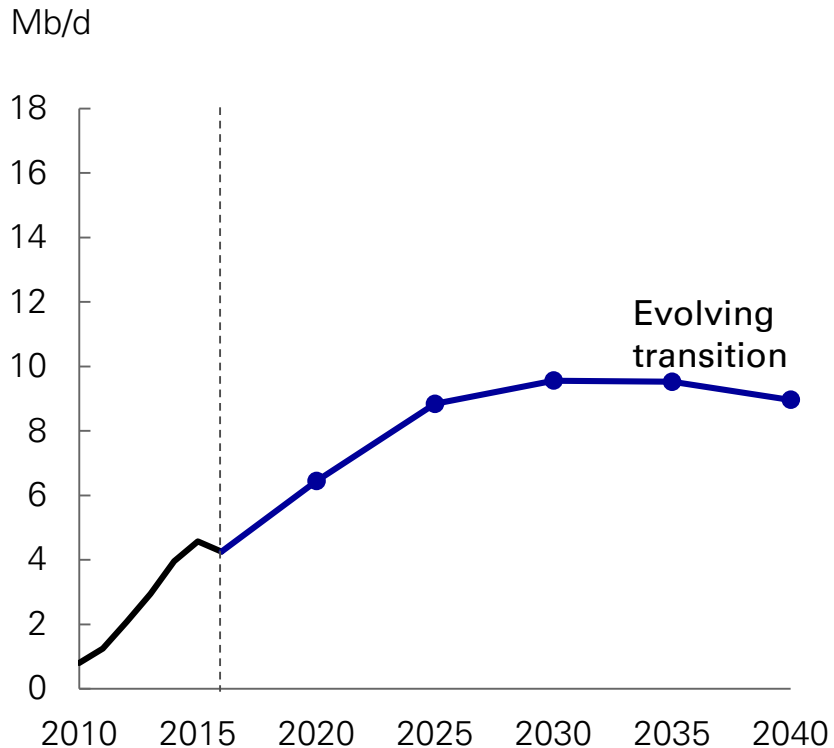
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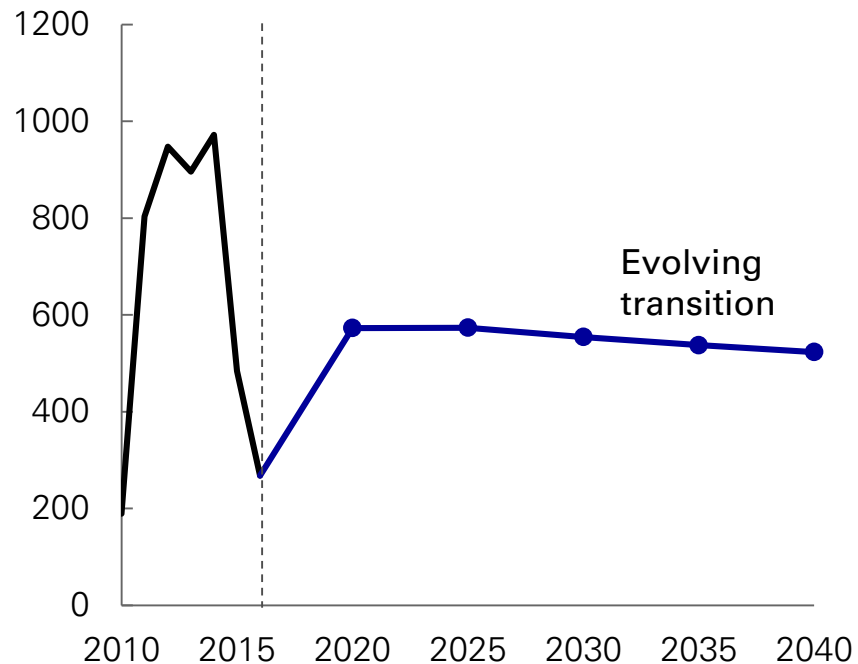


# US tight oil: alternative scenarios

## US tight oil production



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

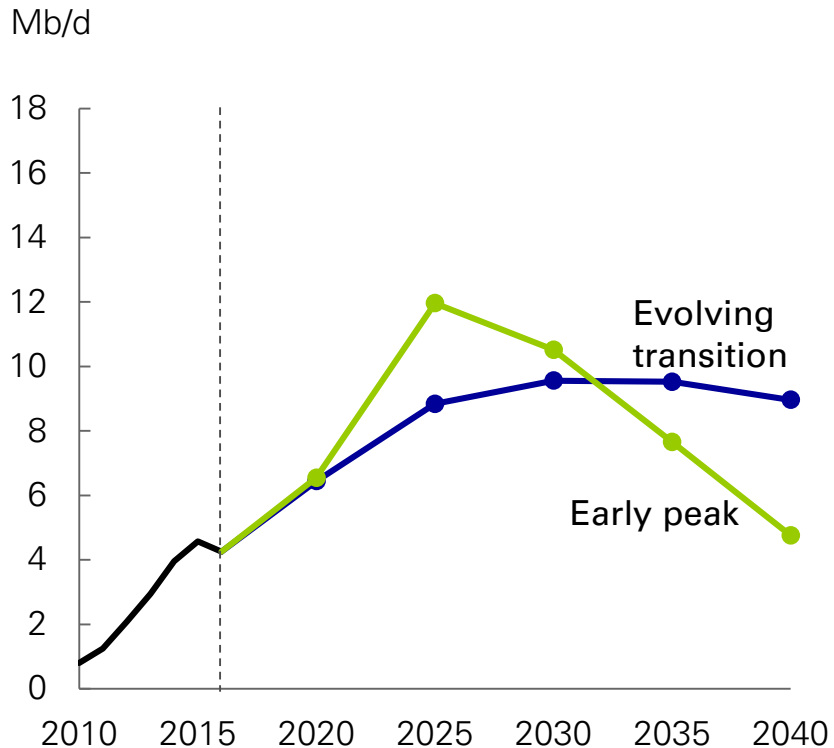


\*Permian, Eagle Ford, Bakken and Niobrara

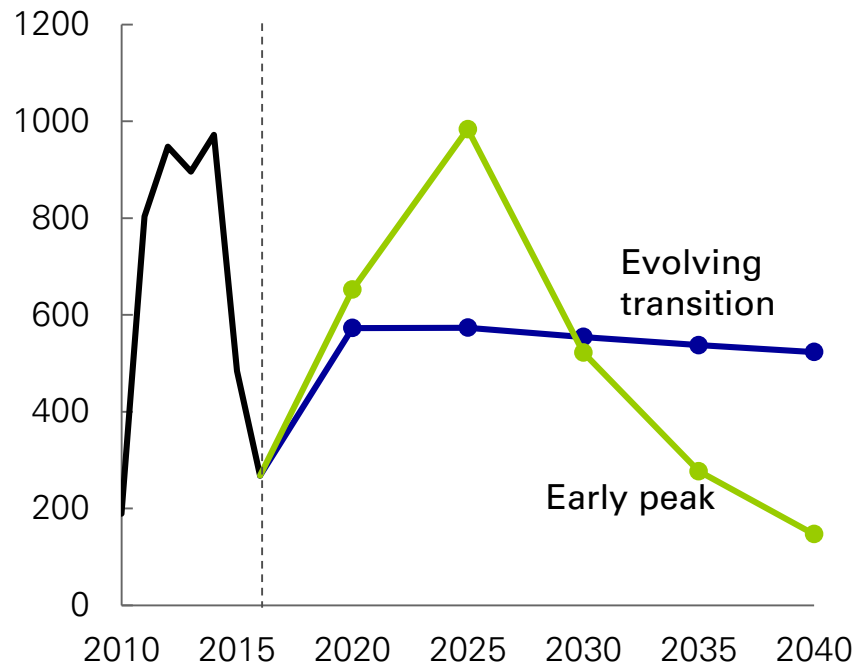
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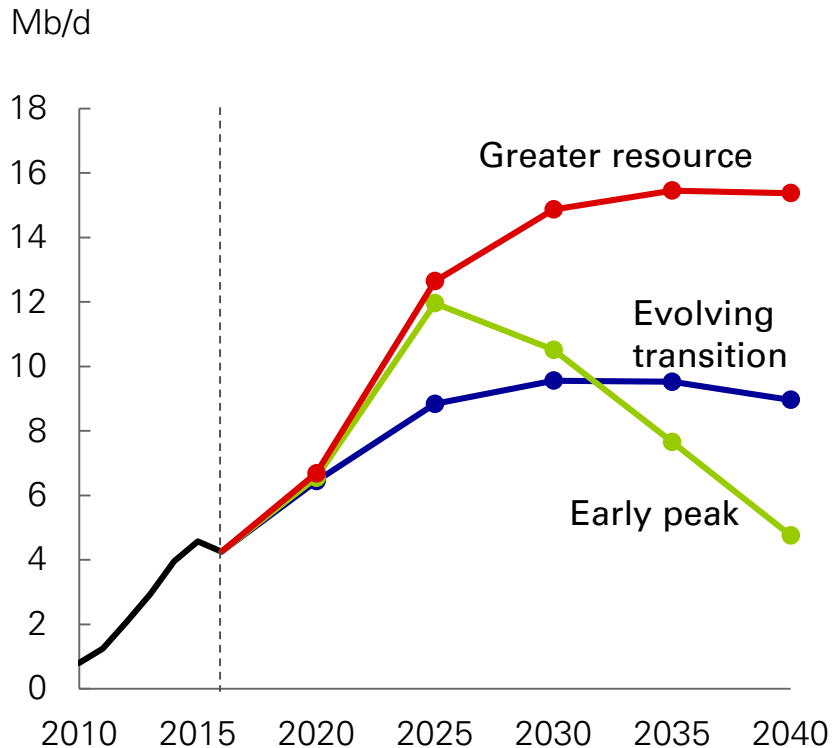


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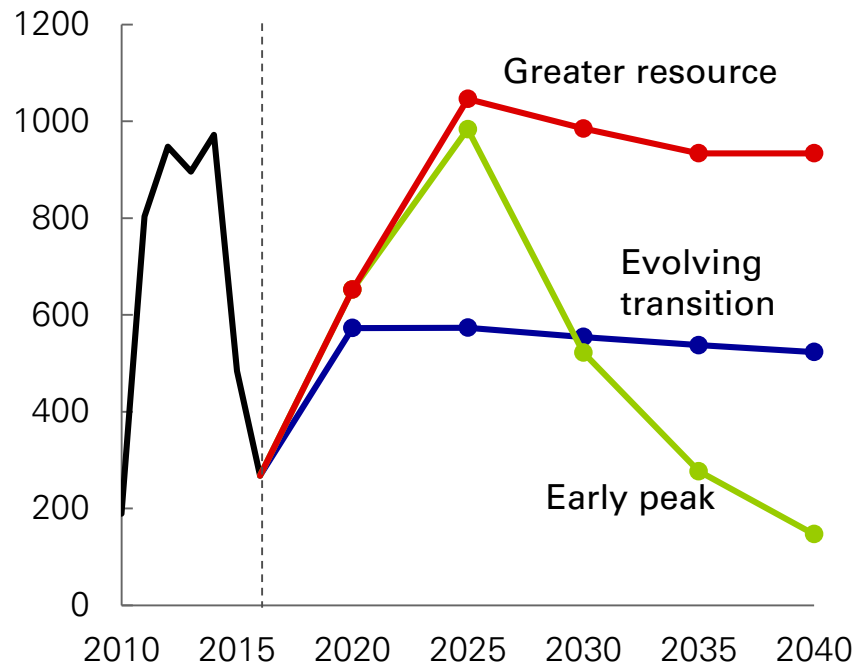


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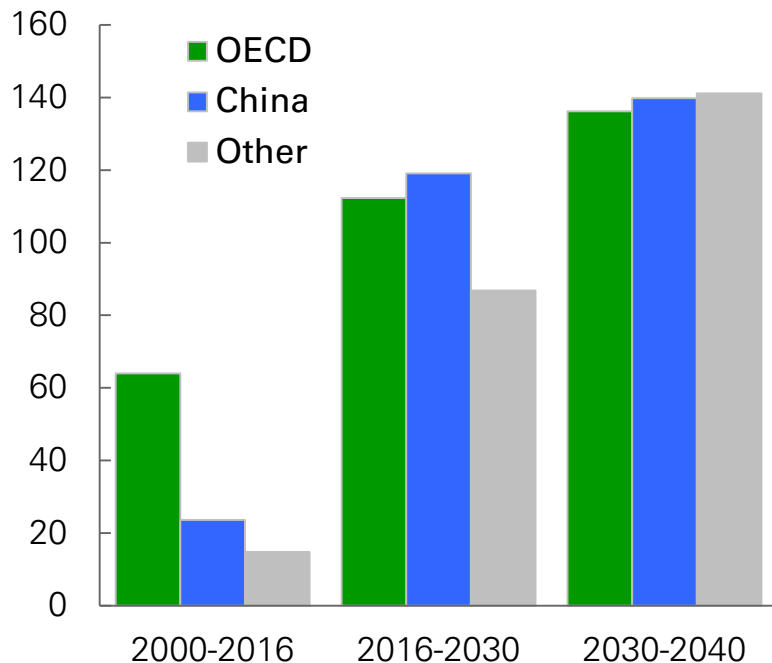
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# Rapid growth in renewable energy

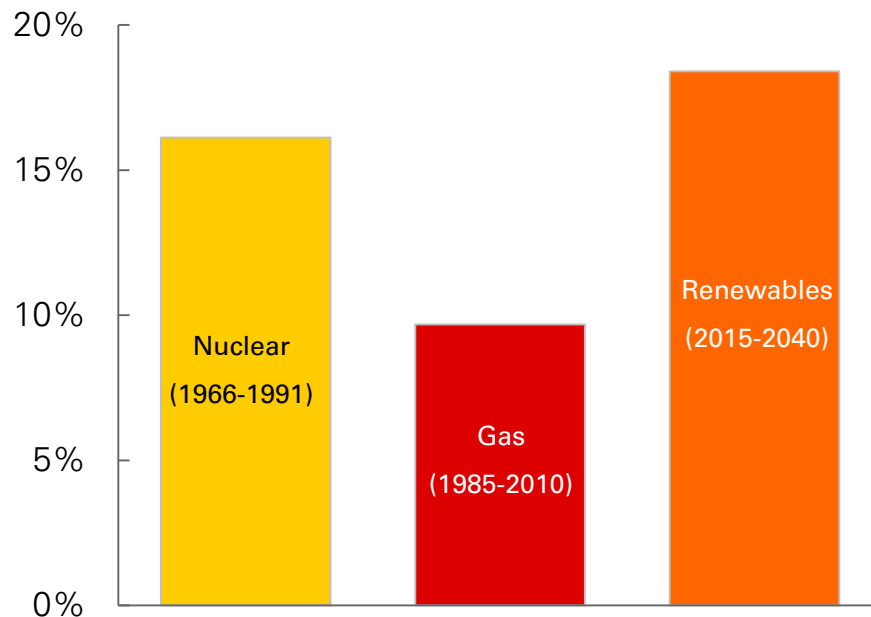
## Growth of renewable power

TWh, average annual growth



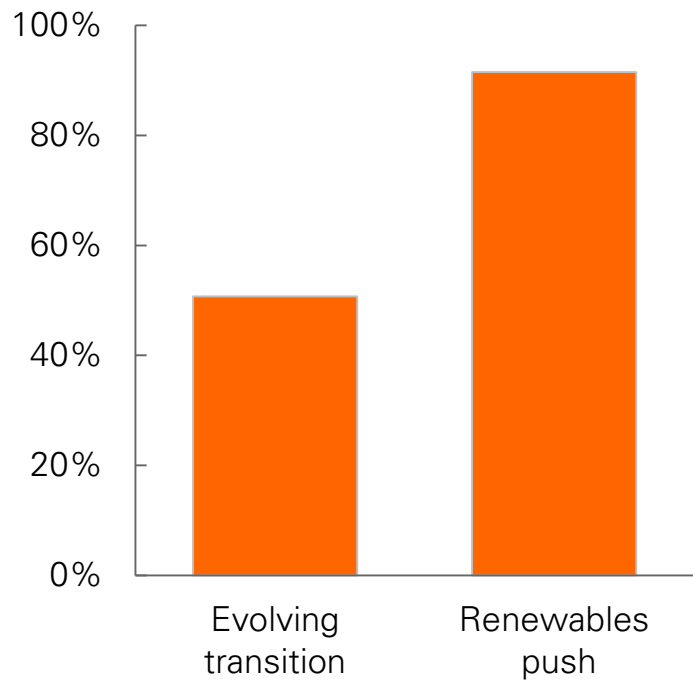
## Pace of power market penetration

Largest gains in market share over 25 years, %pts



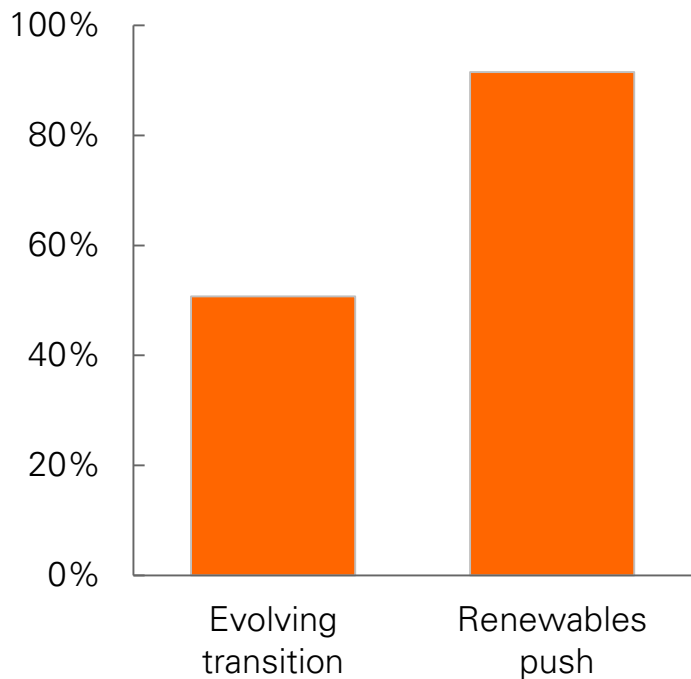
# 'Renewables push' scenario

Renewables share of power growth  
2016-2040

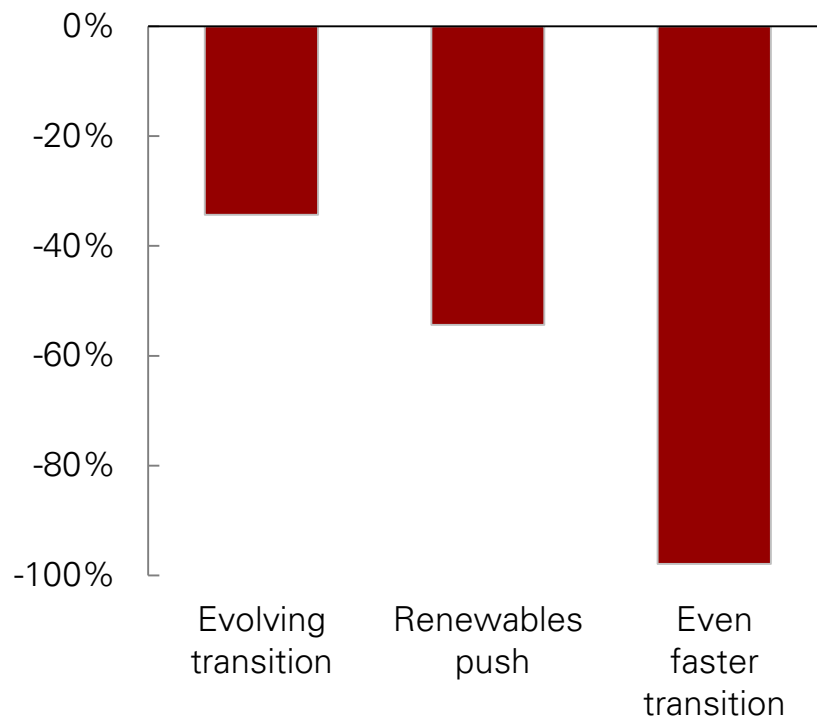


# 'Renewables push' scenario

Renewables share of power growth  
2016-2040



Change in carbon intensity of power  
2016-2040

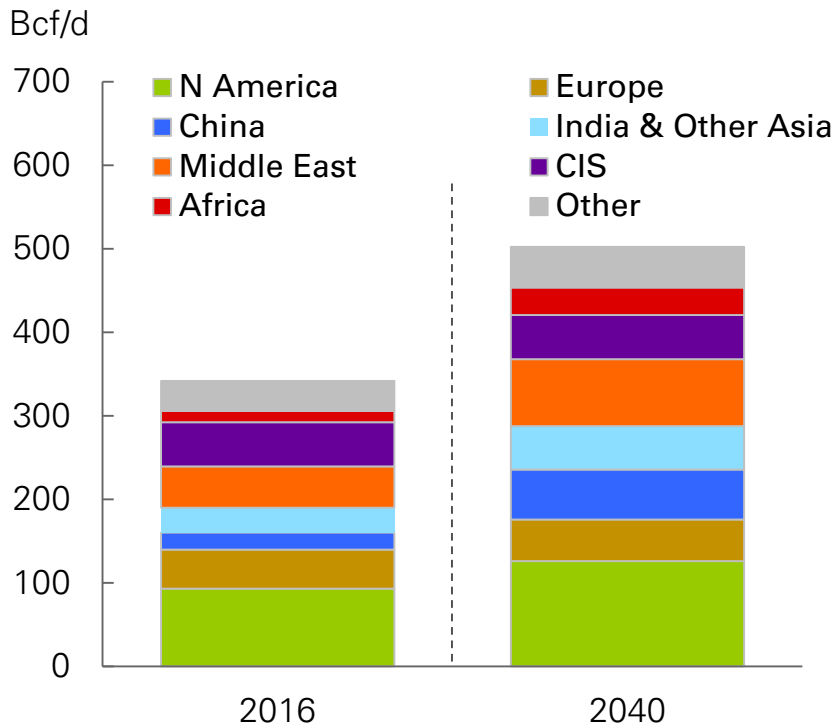


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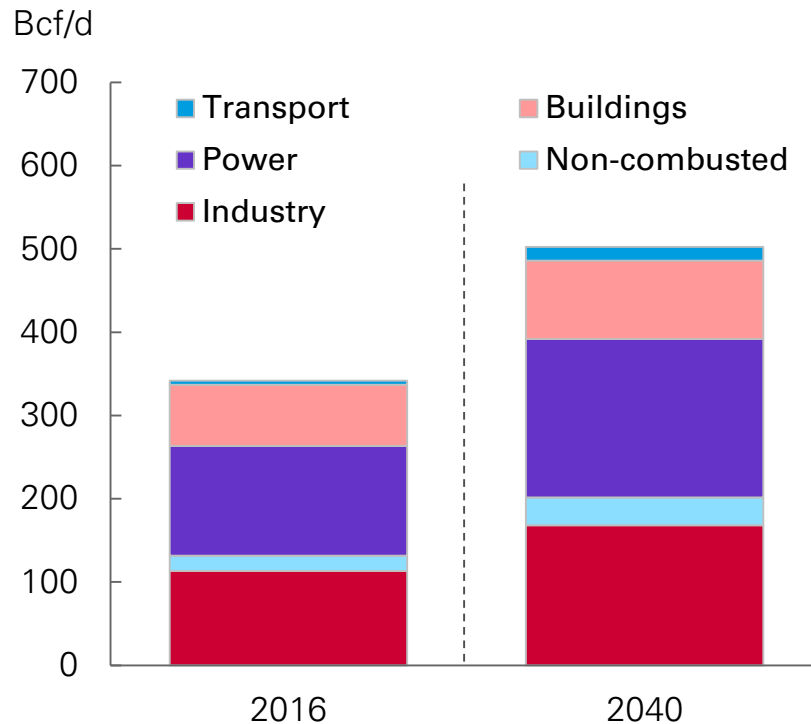
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# Growth in natural gas demand

## Gas consumption by region

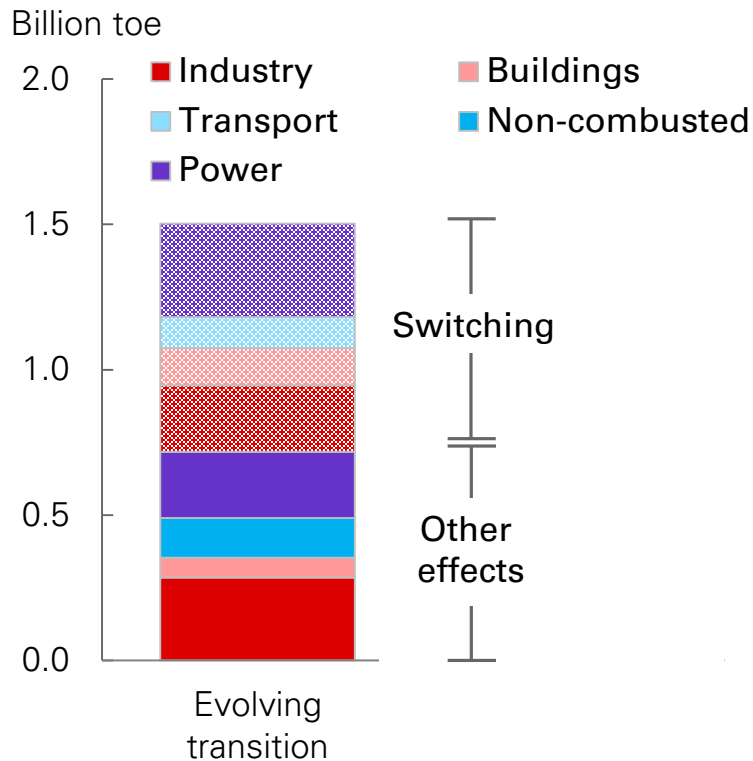


## Gas consumption by sector



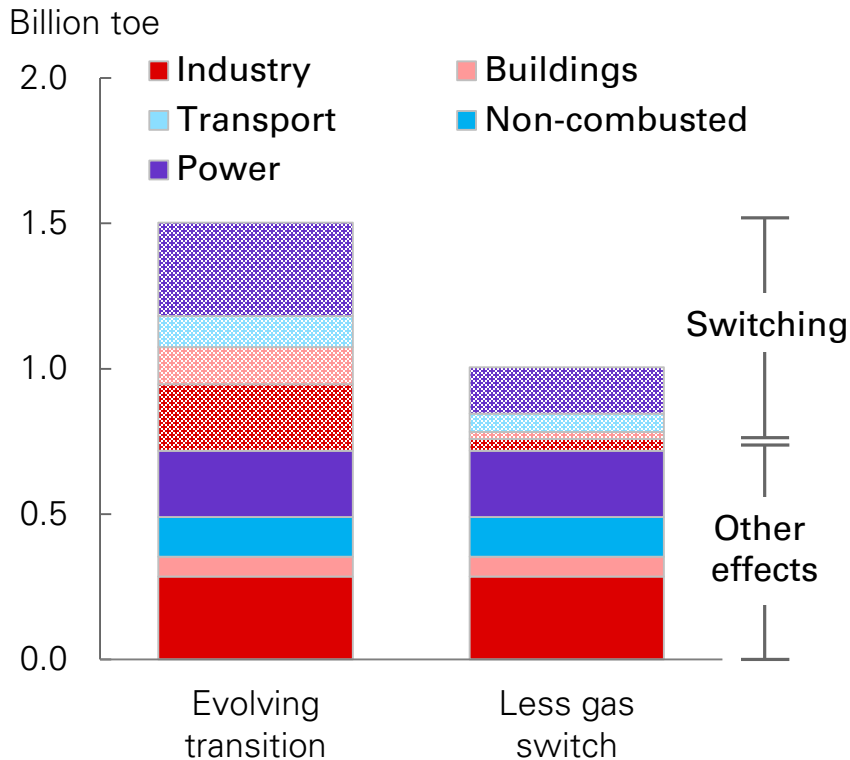
# Possible risks to the outlook for natural gas

Gas demand increase  
2016-2040

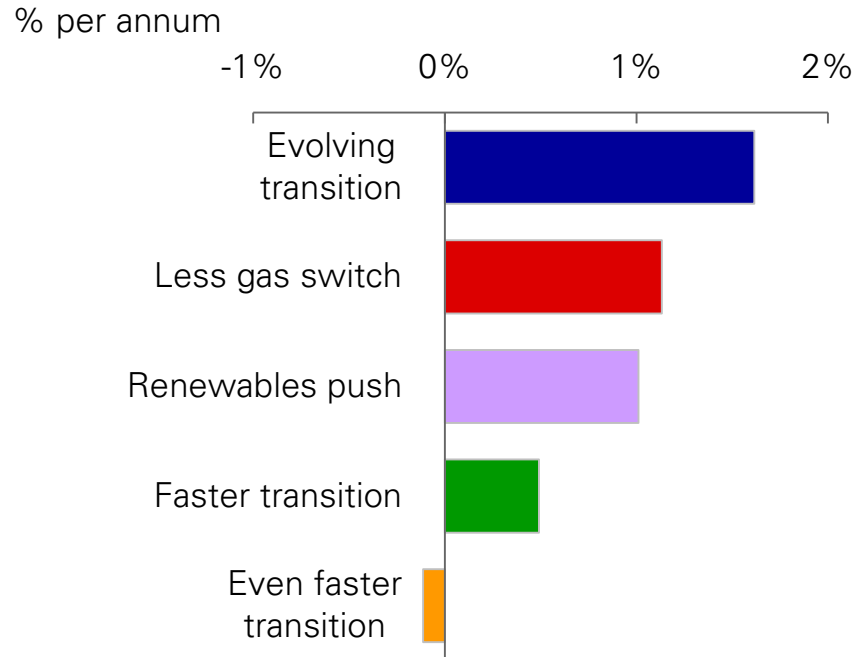


# Possible risks to the outlook for natural gas

Gas demand increase  
2016-2040



Gas demand growth  
2016-2040

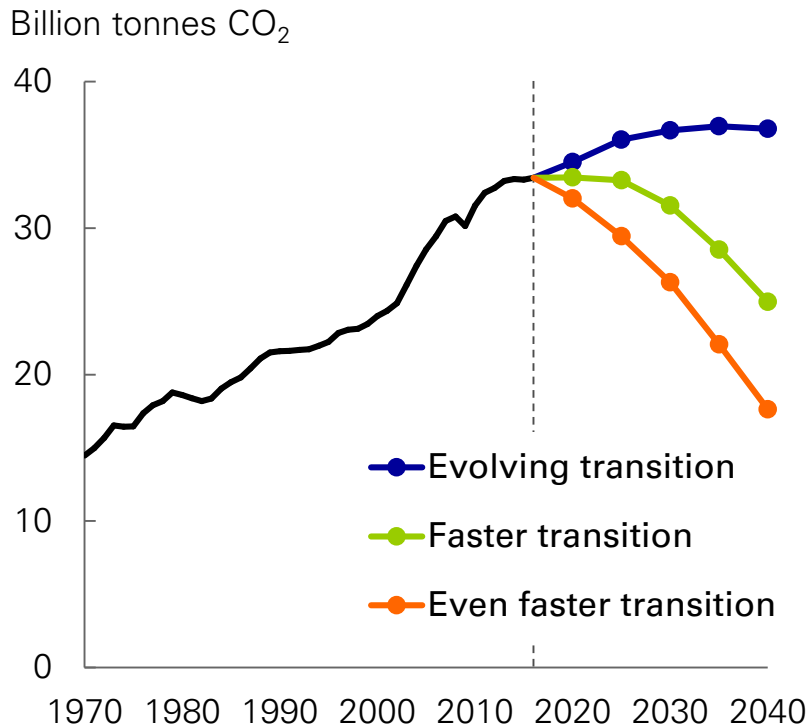


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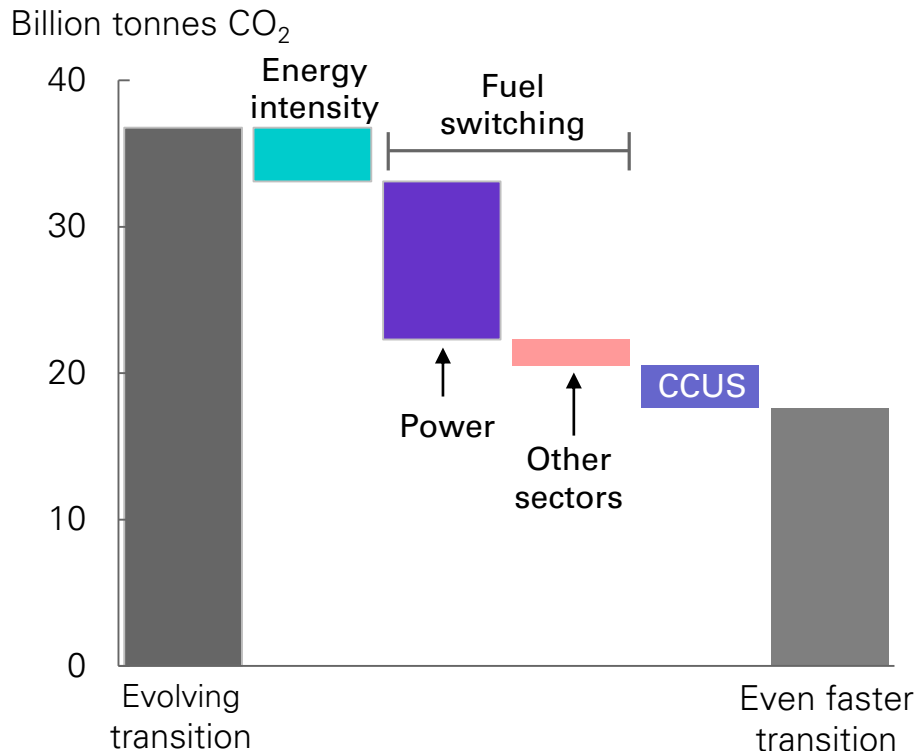
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# Carbon emissions continue to rise in the ET scenario

Carbon emissions



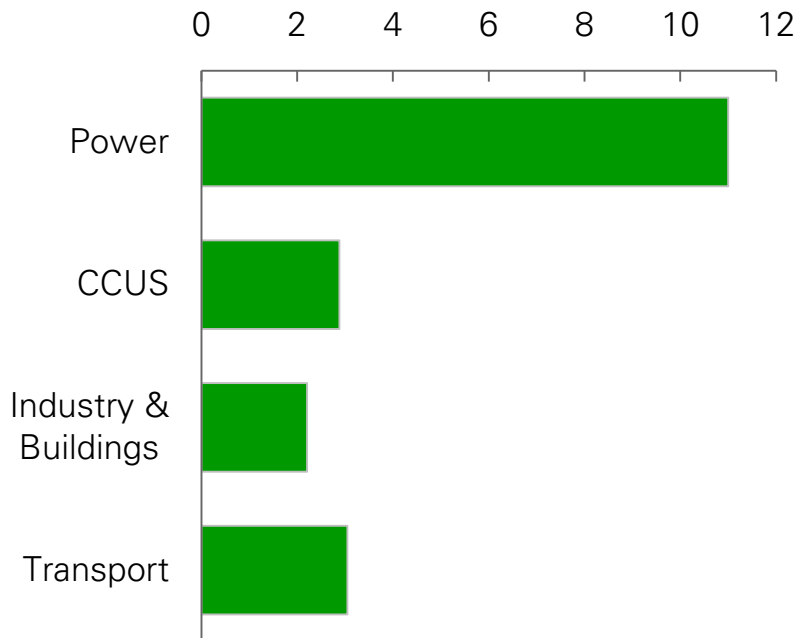
Carbon emissions in 2040:  
EFT versus ET scenario



# Impact of faster transition on global energy system

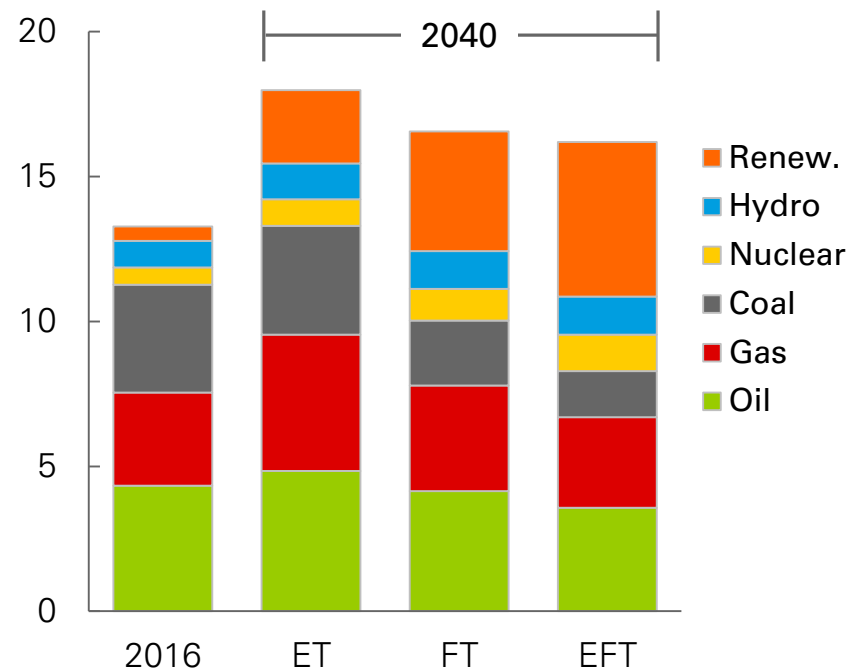
Reductions in carbon emissions:  
EFT versus ET scenario

Billion tonnes CO<sub>2</sub> in 2040



Primary energy consumption under  
different scenarios

Billion toe



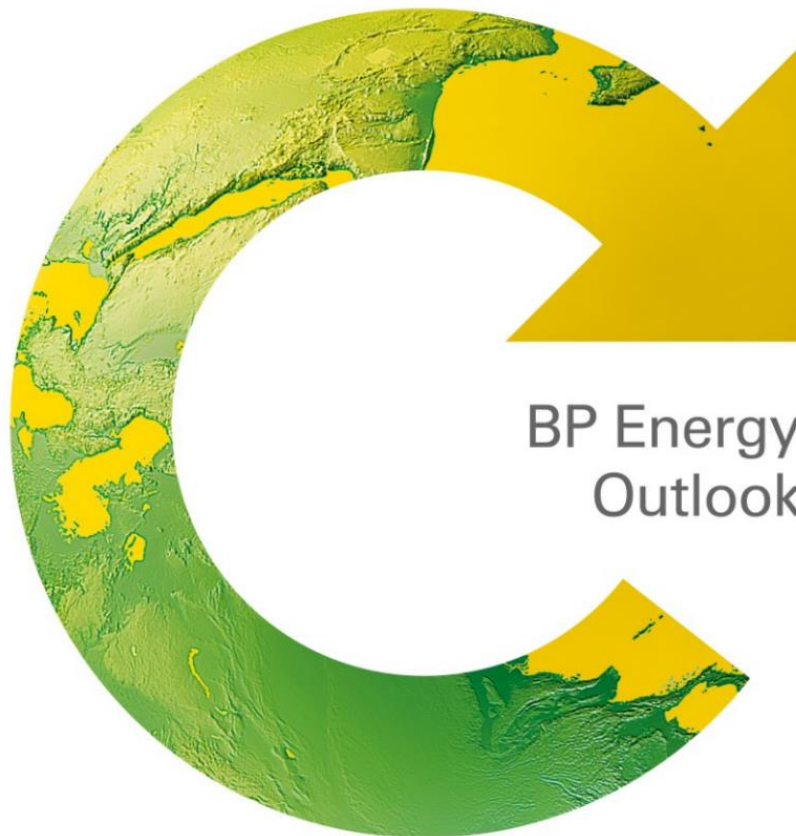
# Conclusion

- 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?



# BP Energy Outlook

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