

# BP Energy Outlook

## 2016 edition



Spencer Dale, group chief economist

Outlook  
to 2035

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



# Disclaimer

---

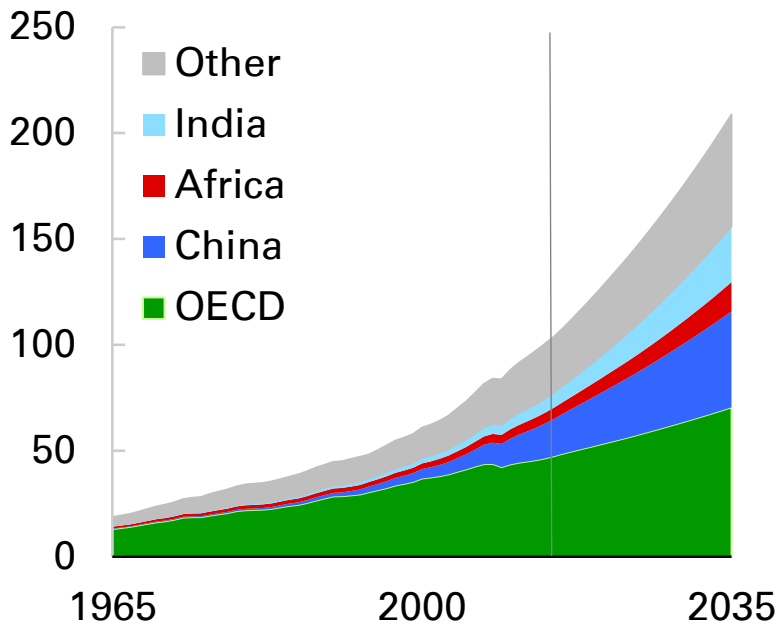
This presentation contains forward-looking statements, particularly those regarding global economic growth, population growth, energy consumption, policy support for renewable energies and sources of energy supply. Forward-looking statements involve risks and uncertainties because they relate to events, and depend on circumstances, that will or may occur in the future. Actual outcomes may differ depending on a variety of factors, including product supply, demand and pricing; political stability; general economic conditions; legal and regulatory developments; availability of new technologies; natural disasters and adverse weather conditions; wars and acts of terrorism or sabotage; and other factors discussed elsewhere in this presentation. BP disclaims any obligation to update this presentation. Neither BP p.l.c. nor any of its subsidiaries (nor their respective officers, employees and agents) accept liability for any inaccuracies or omissions or for any direct, indirect, special, consequential or other losses or damages of whatsoever kind in connection to this presentation or any information contained in it.

Unless noted otherwise, data definitions are based on the BP Statistical Review of World Energy, and historical energy data up to 2014 are consistent with the 2015 edition of the Review. Gross Domestic Product (GDP) is expressed in terms of real Purchasing Power Parity (PPP) at 2010 prices.

# Economic backdrop

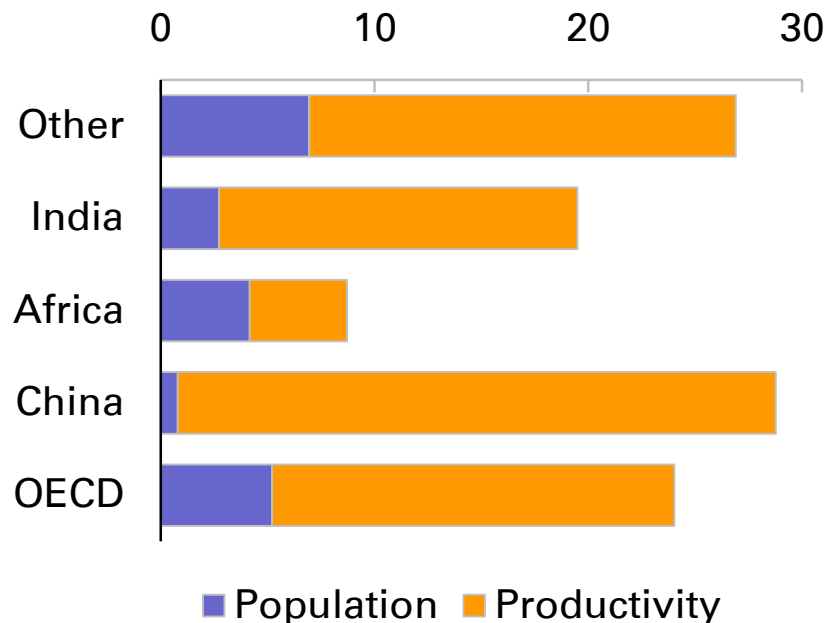
## GDP

Trillion, \$2010



## Contribution to GDP growth 2014-35

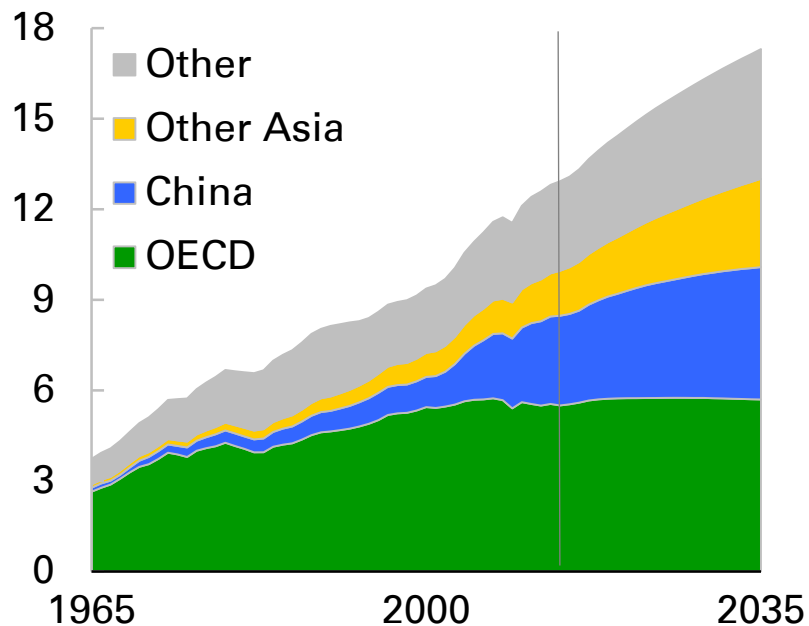
Trillion, \$2010



# Global energy demand

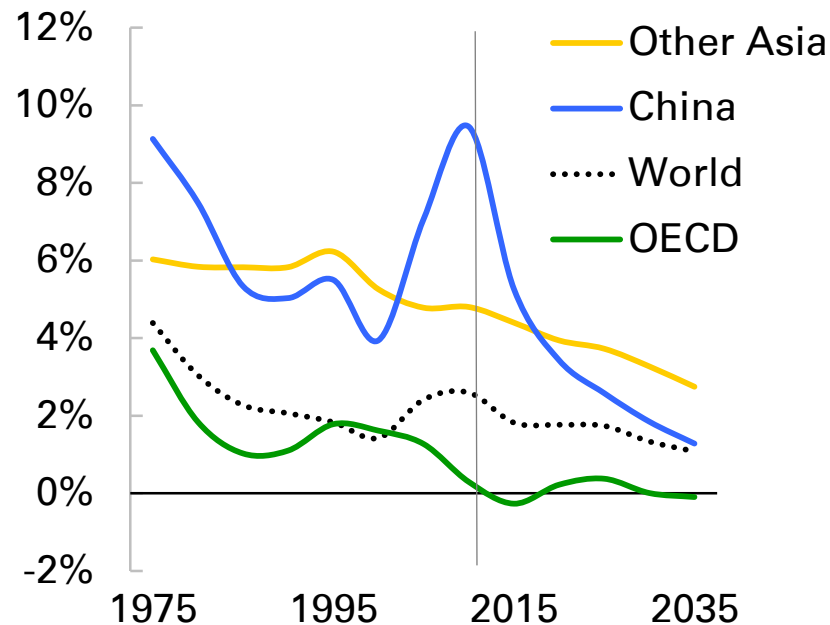
## Consumption by region

Billion toe



## Consumption growth by region

10 year average, % per annum

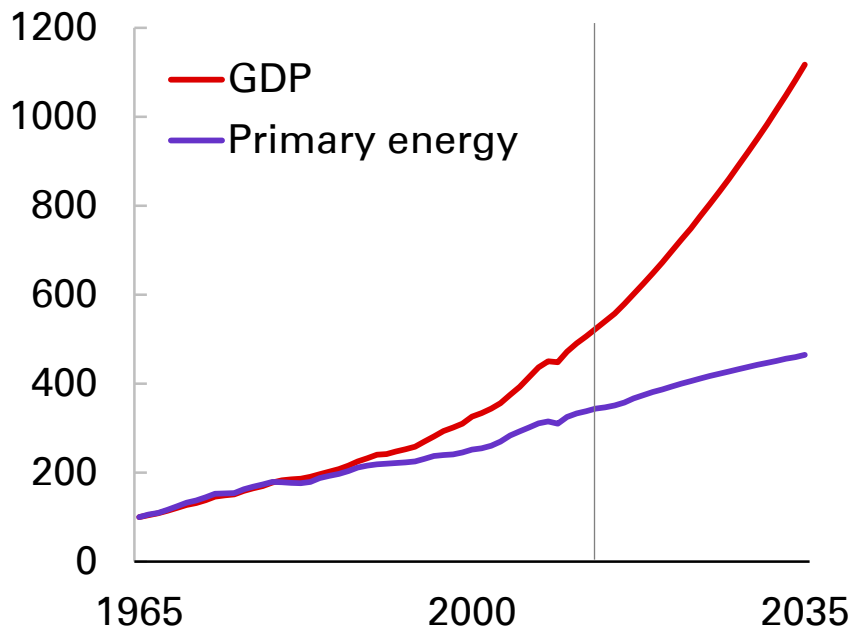


# What drives energy demand?

# Global GDP and energy

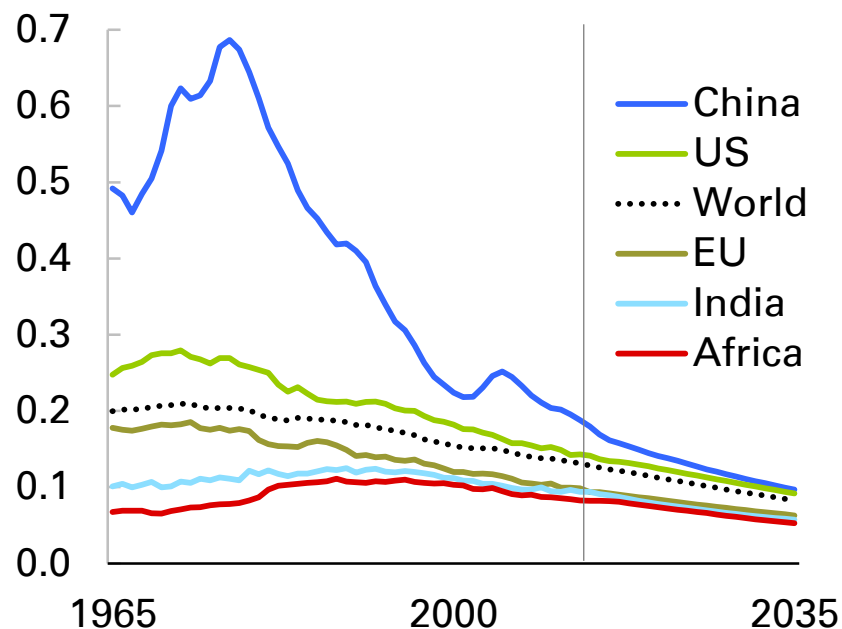
## World GDP and energy demand

Index (1965=100)



## Energy intensity by region

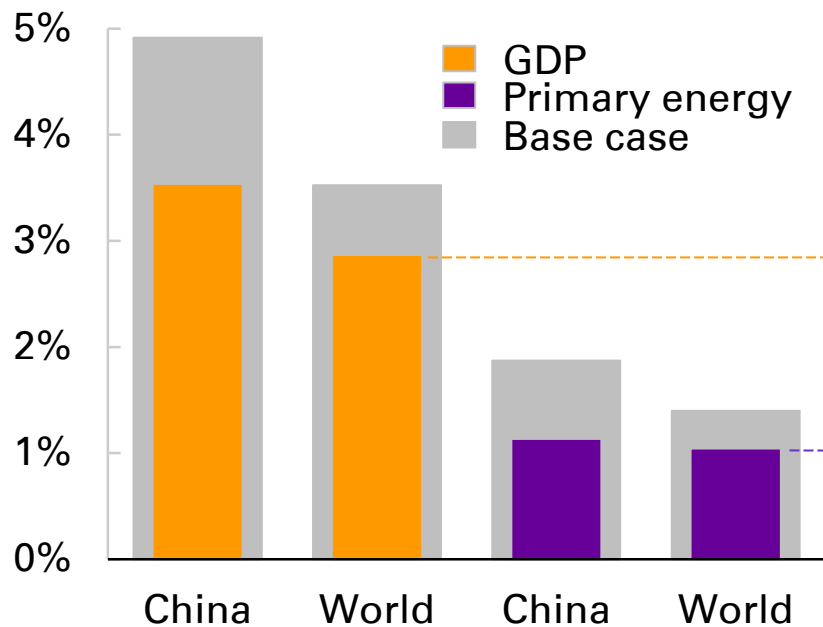
Toe per thousand \$2010 GDP



# Slower global GDP growth

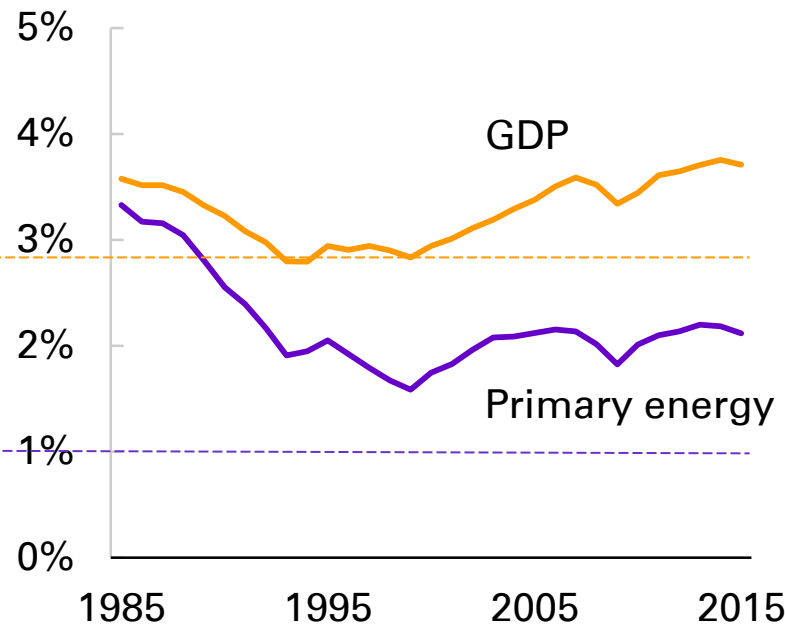
## Annual growth rates 2014-35

% per annum



## Historical growth rates

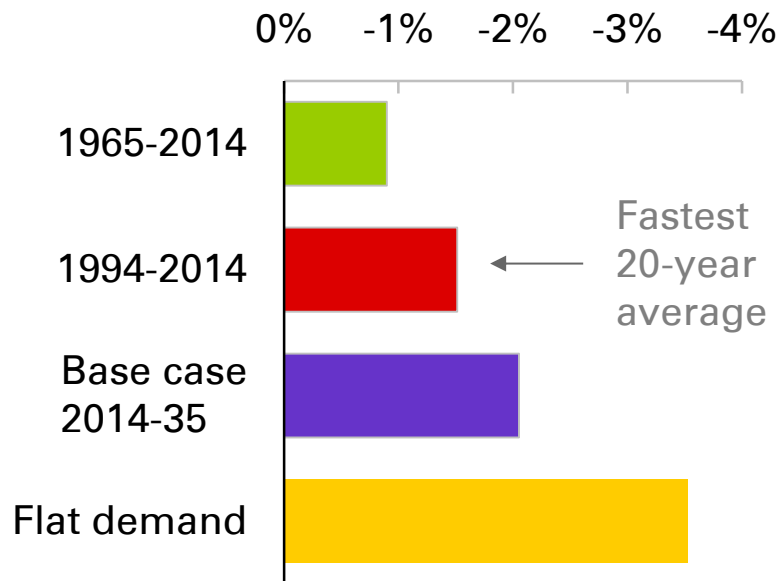
% per annum, 20-year moving average



# Energy intensity and energy demand

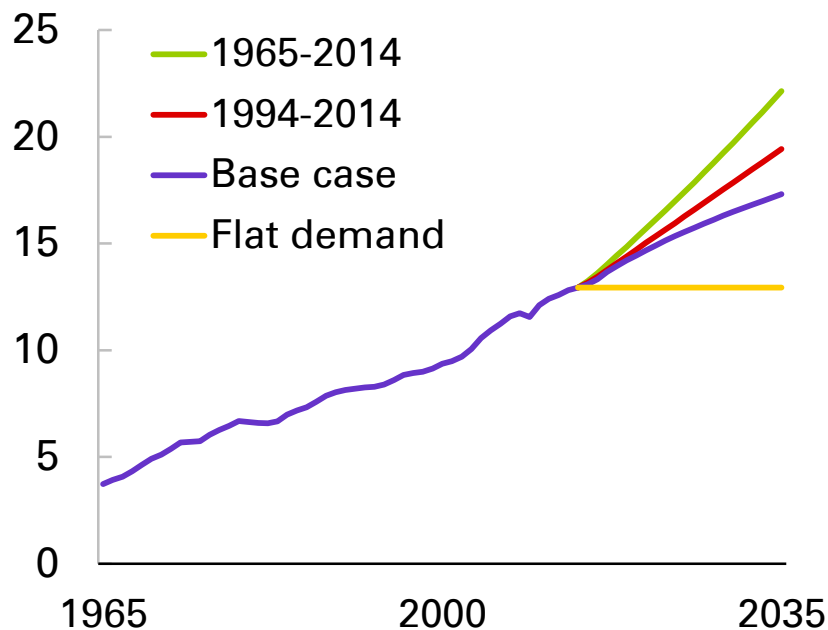
## Decline in world energy intensity

% per annum



## World energy demand

Billion toe



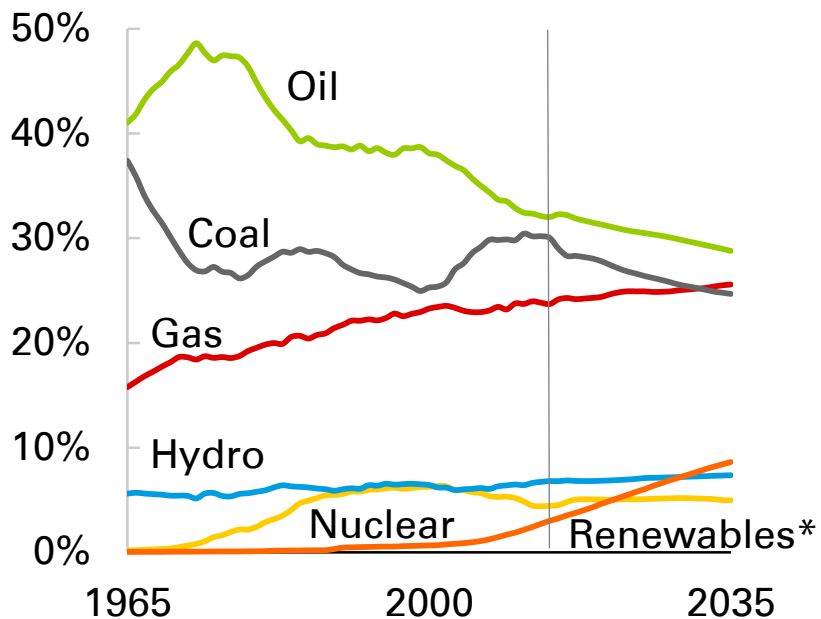


Q: What drives energy demand?

A: Global economic growth

# Fuel mix

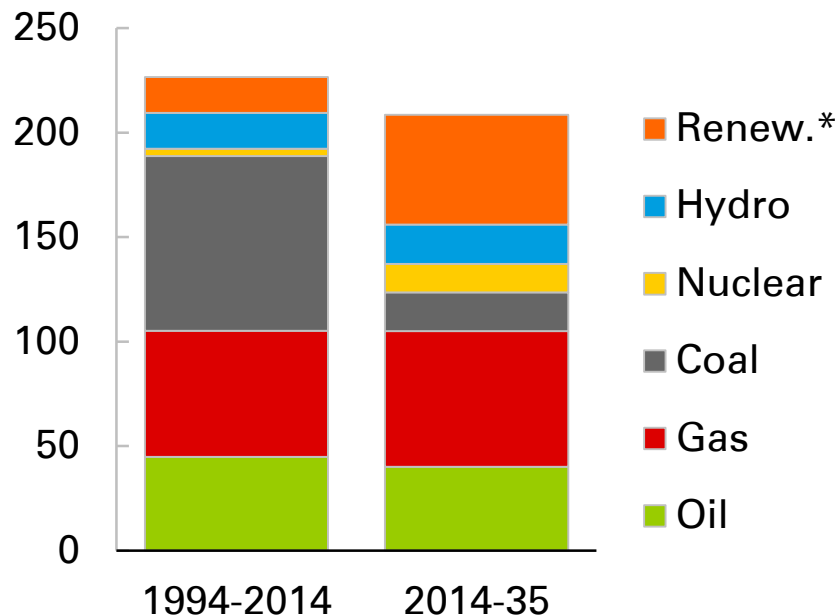
## Shares of primary energy



\*Includes biofuels

## Annual demand growth by fuel

Mtoe per annum



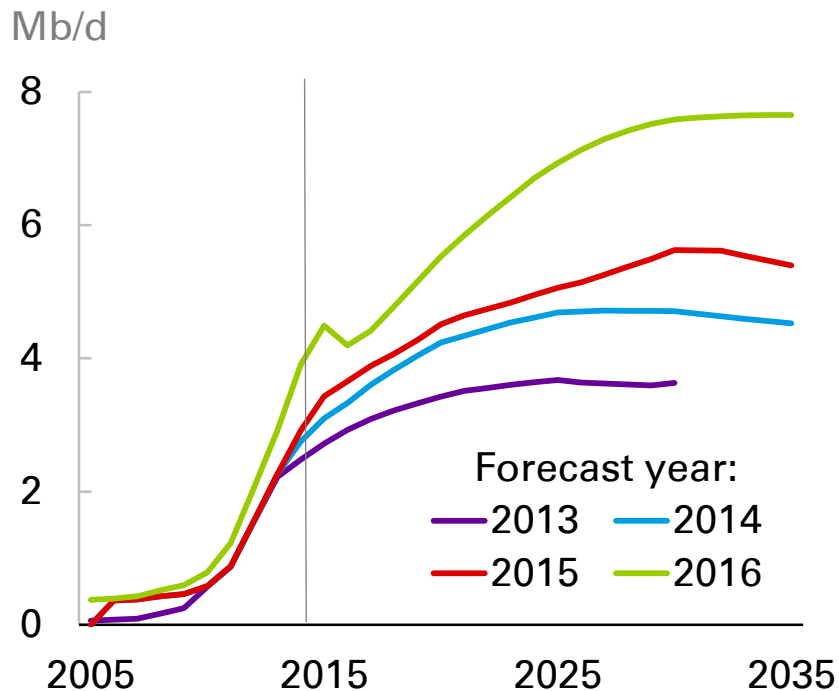
# Key factors shaping the fuel mix

---

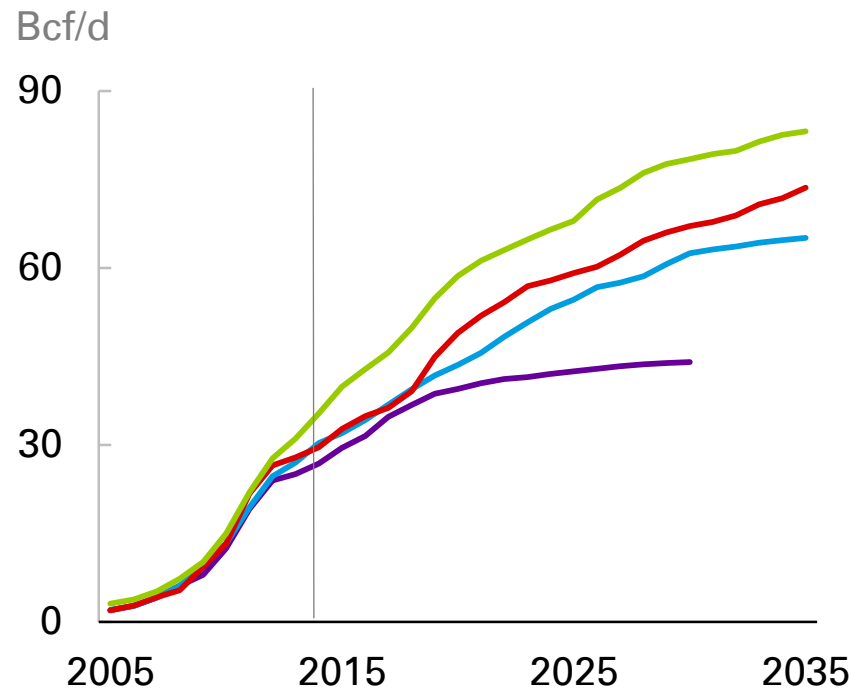
- What have we learned about US shale?
- China's changing energy needs
- Prospects for renewables and other non-fossil fuels

# US tight oil and shale gas

## US tight oil forecasts

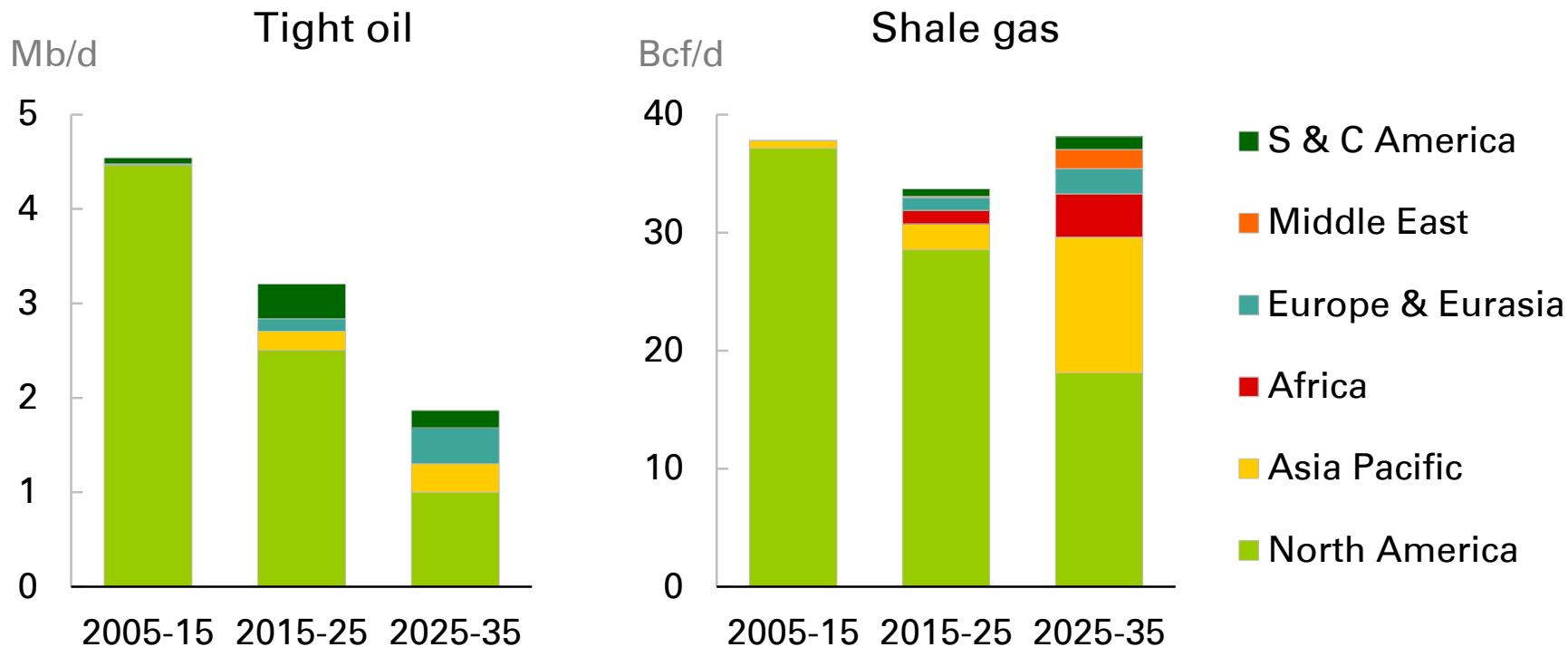


## US shale gas forecasts



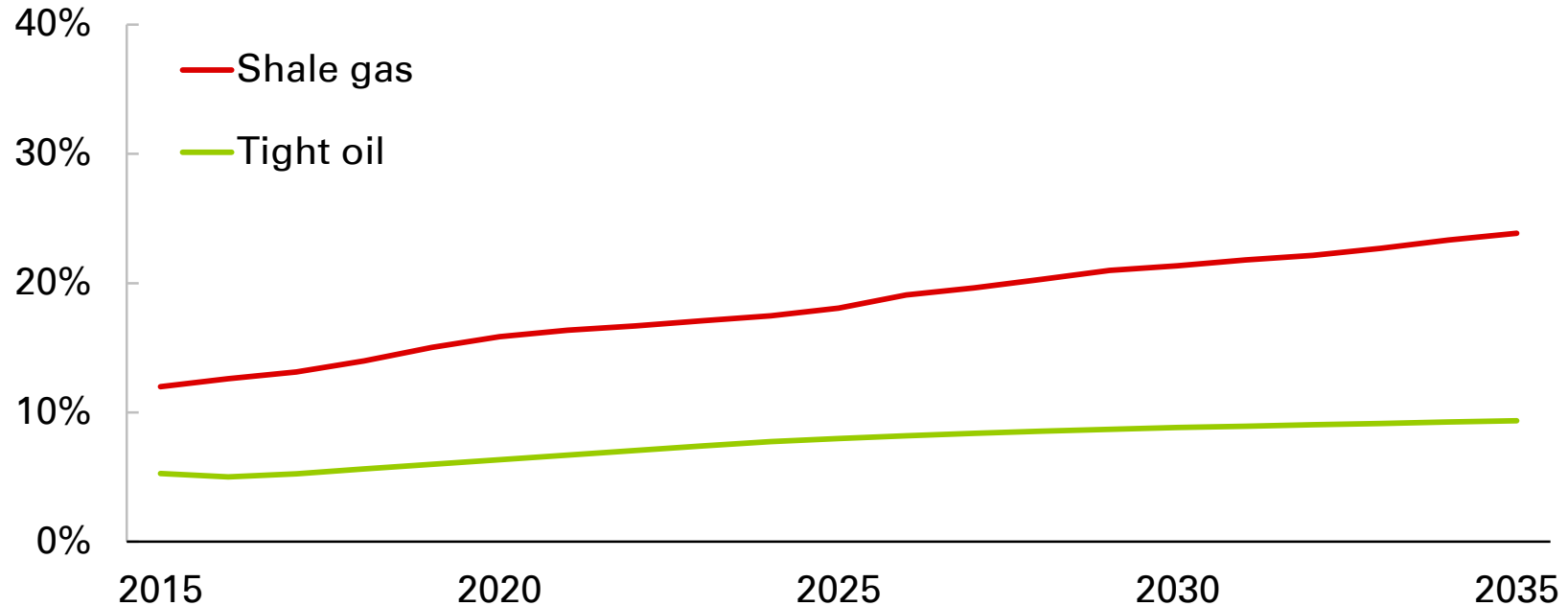
# Global tight oil and shale gas

Ten year supply increments:



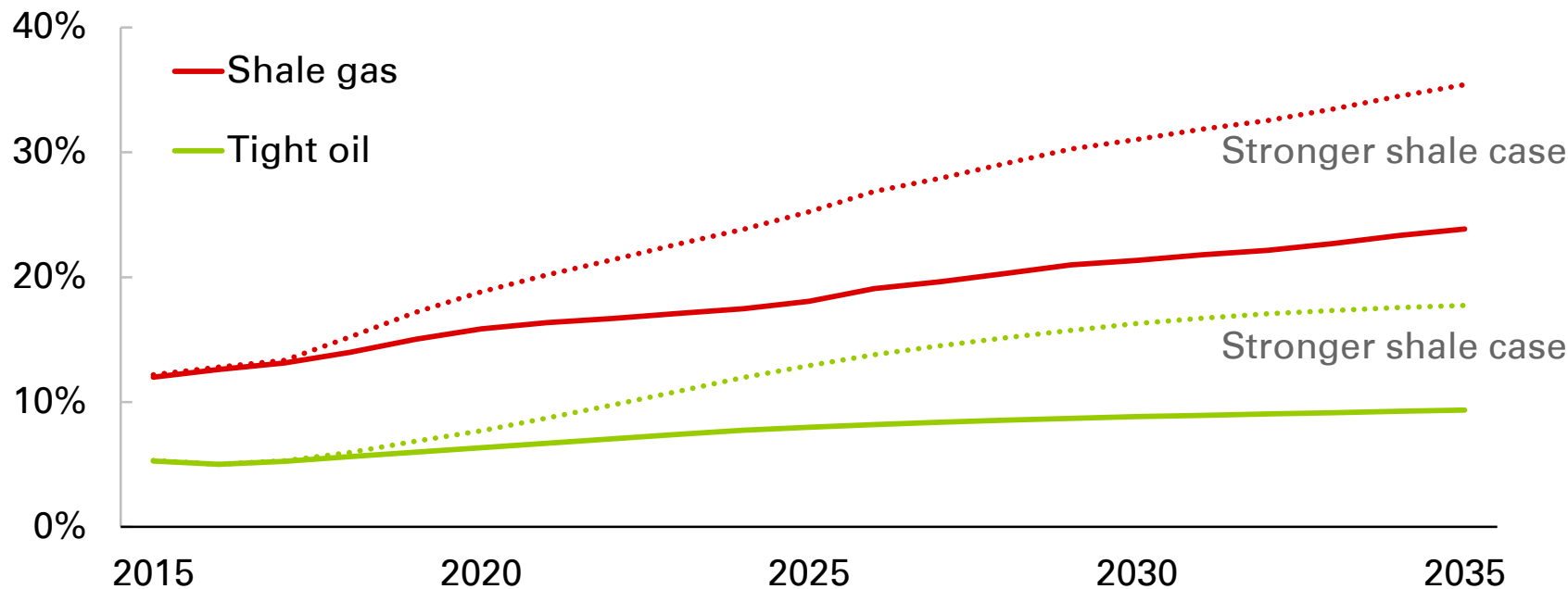
# Market shares of tight oil and shale gas

Shares of total oil/gas production



# Market shares of tight oil and shale gas

Shares of total oil/gas production



# Key factors shaping the fuel mix

---

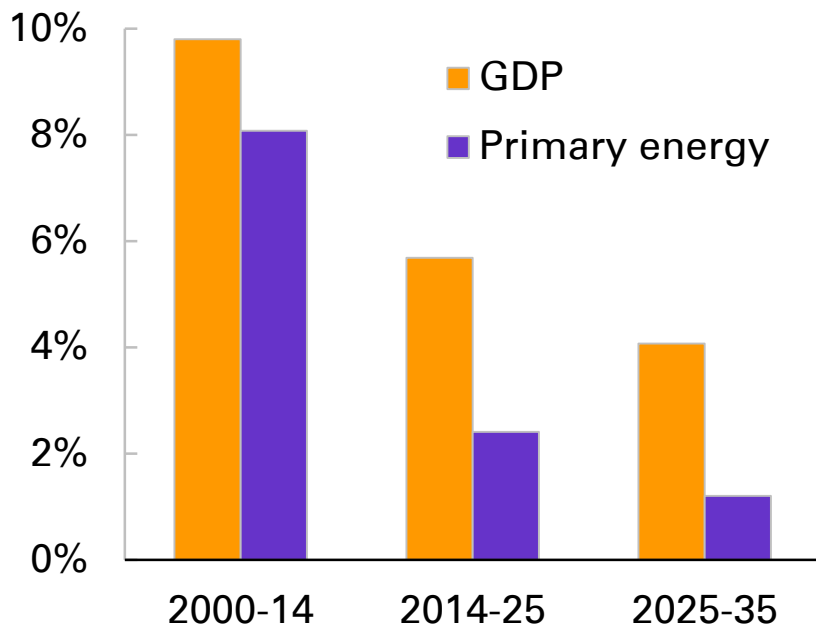
- What have we learned about US shale?
- China's changing energy needs
- Prospects for renewables and other non-fossil fuels



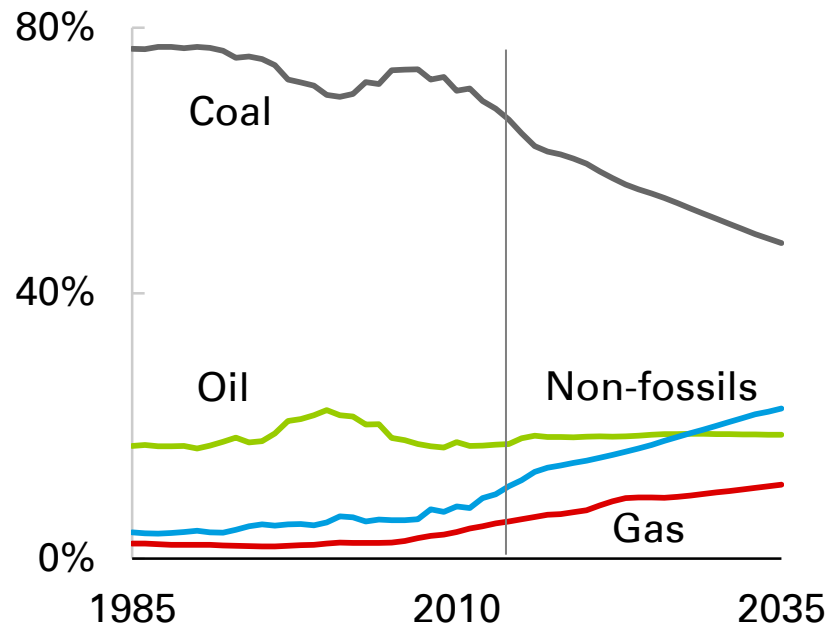
# China's changing energy needs

## GDP and primary energy growth

% per annum



## Shares of primary energy



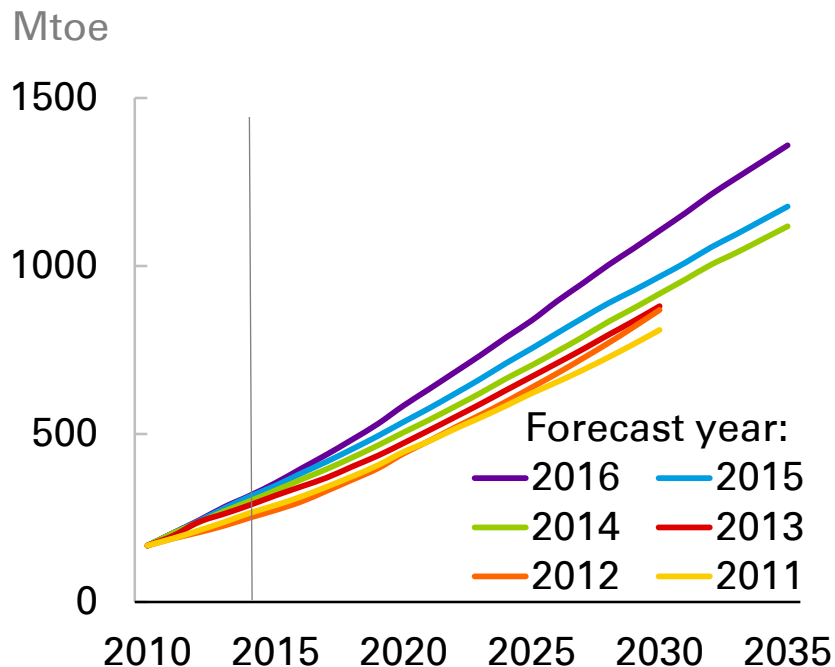
# Key factors shaping the fuel mix

---

- What have we learned about US shale?
- China's changing energy needs
- Prospects for renewables and other non-fossil fuels

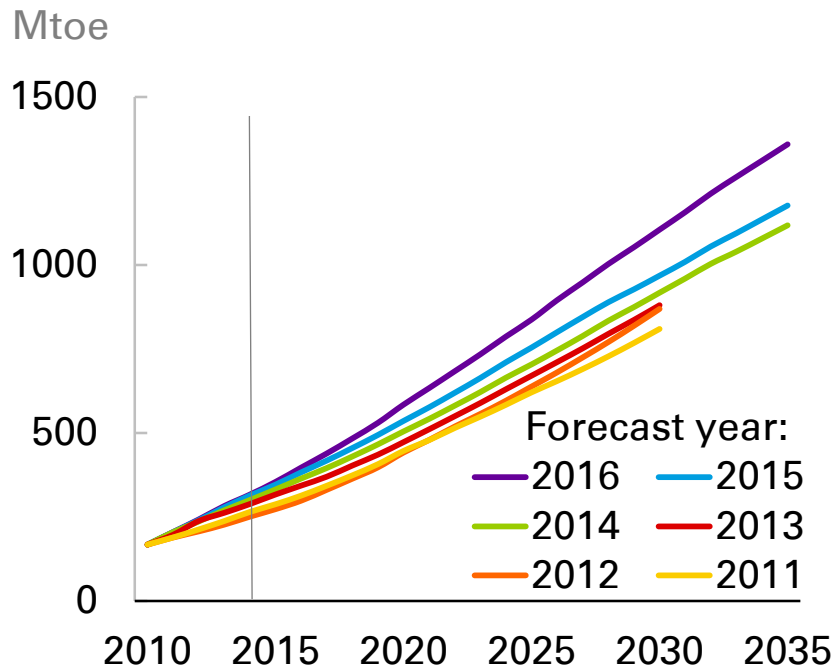
# Renewables and other non-fossil fuels

## Renewables in power forecasts

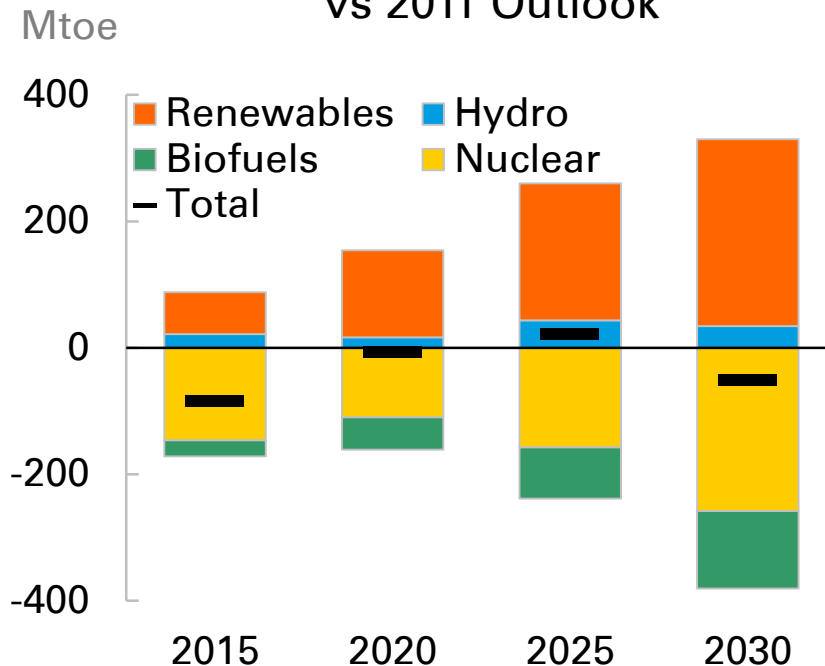


# Renewables and other non-fossil fuels

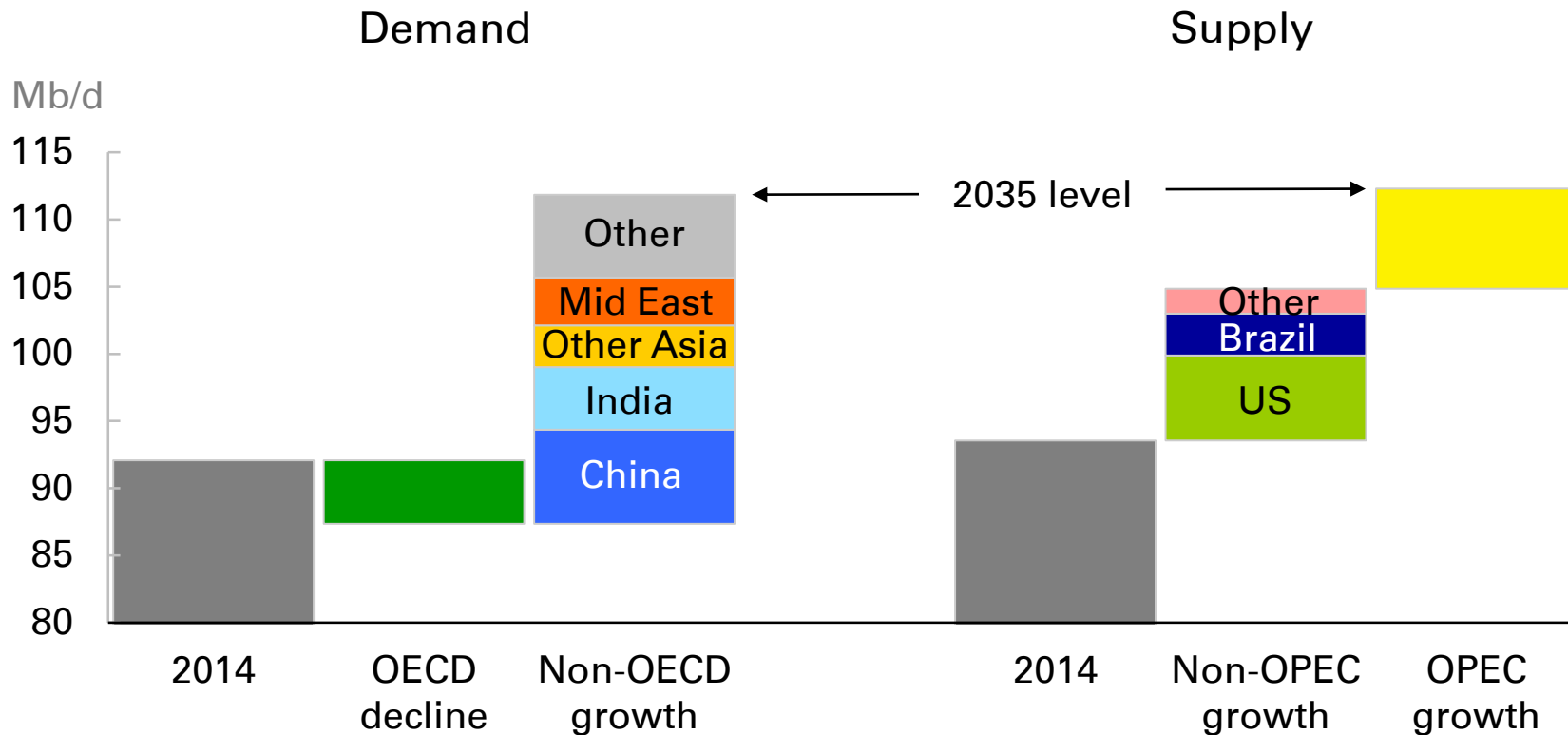
## Renewables in power forecasts



## Revisions to non-fossil fuels vs 2011 Outlook

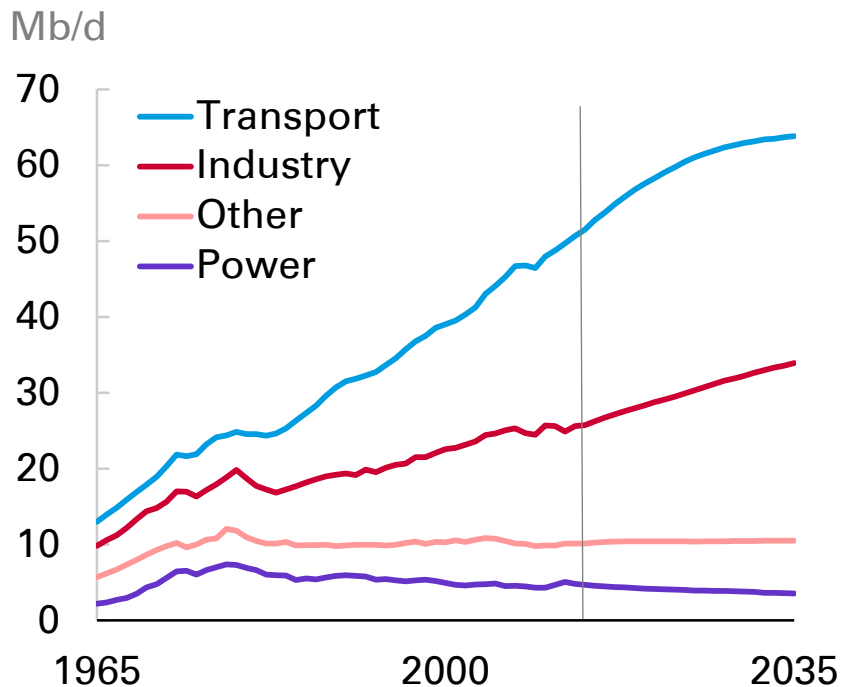


# Oil demand and supply

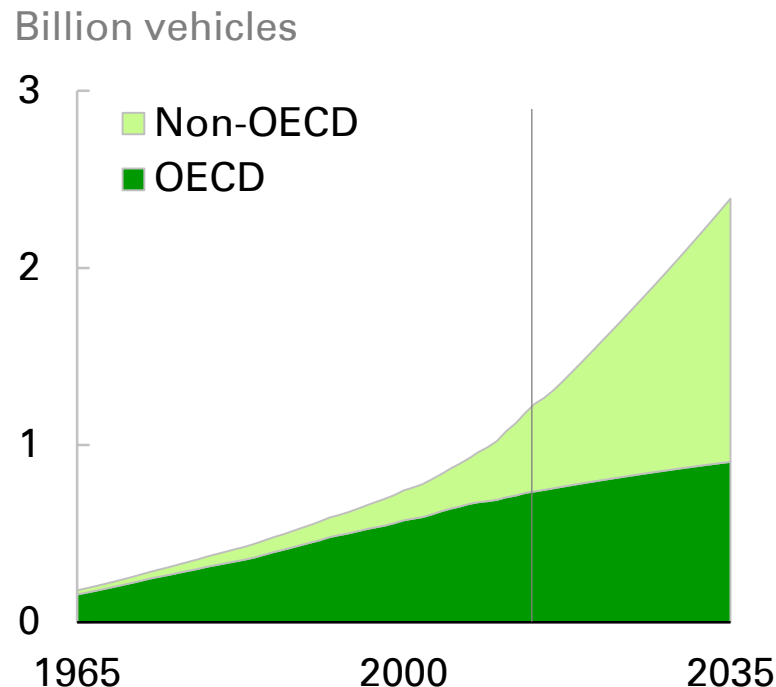


# Oil demand

## Liquids fuel demand by sector



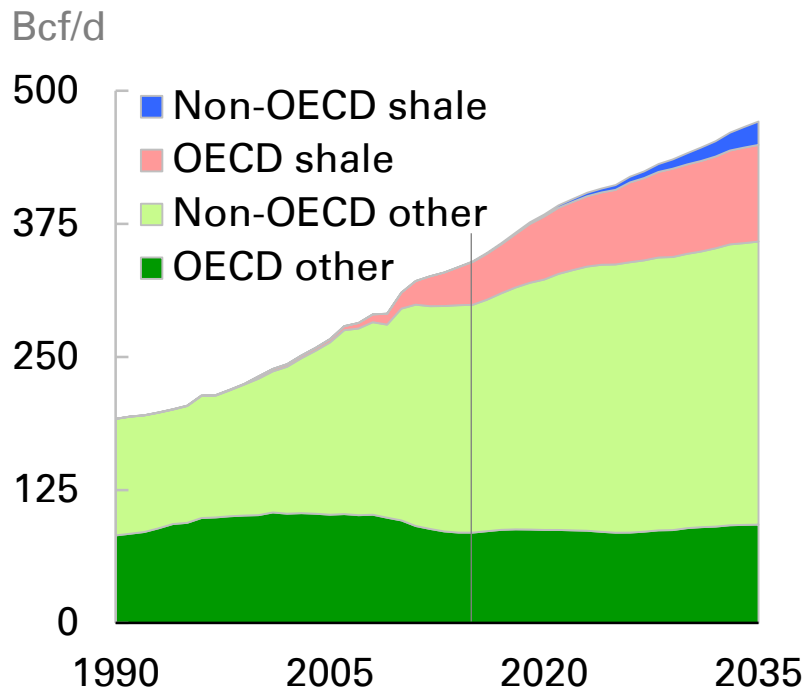
## Vehicle fleet



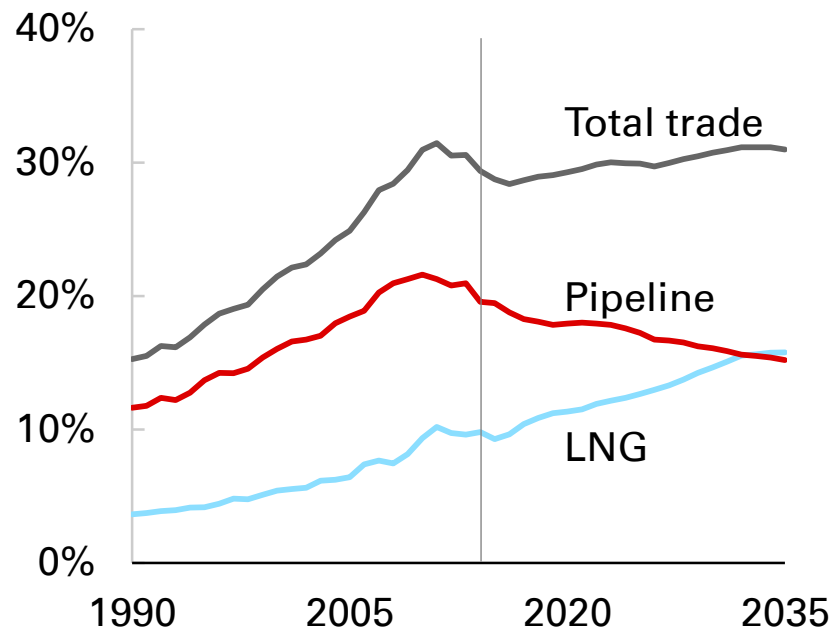
# Natural gas



## Gas production by type and region



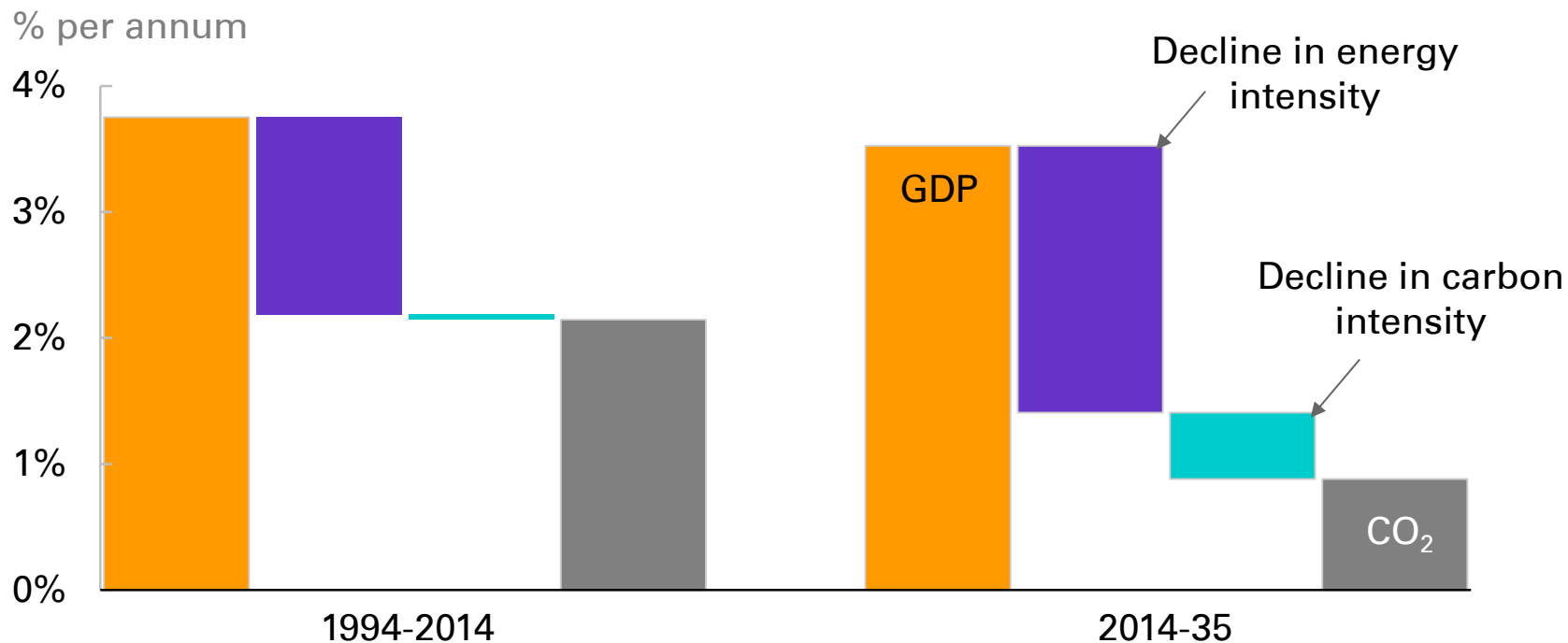
## Shares of global gas consumption



# Changing outlook for carbon emissions



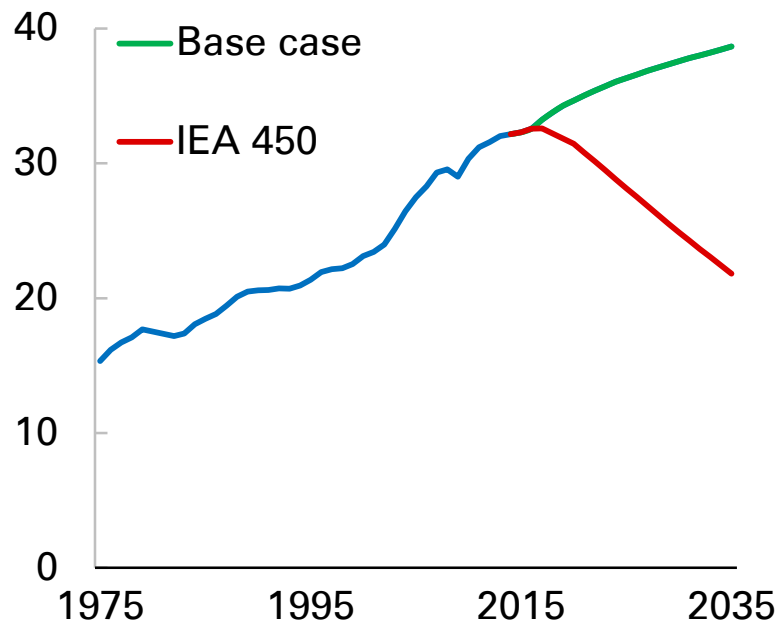
# Carbon emissions



# Outlook for carbon emissions

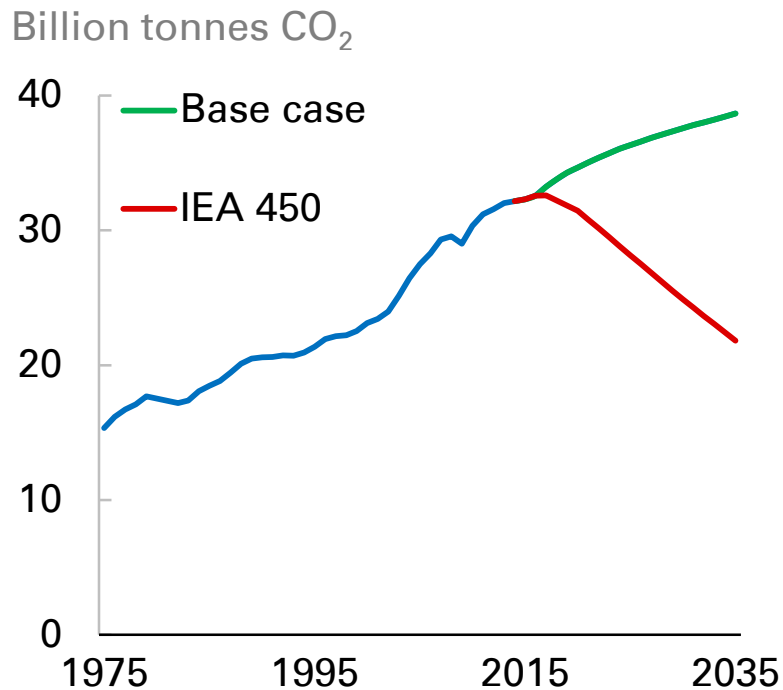
## Carbon emissions

Billion tonnes CO<sub>2</sub>

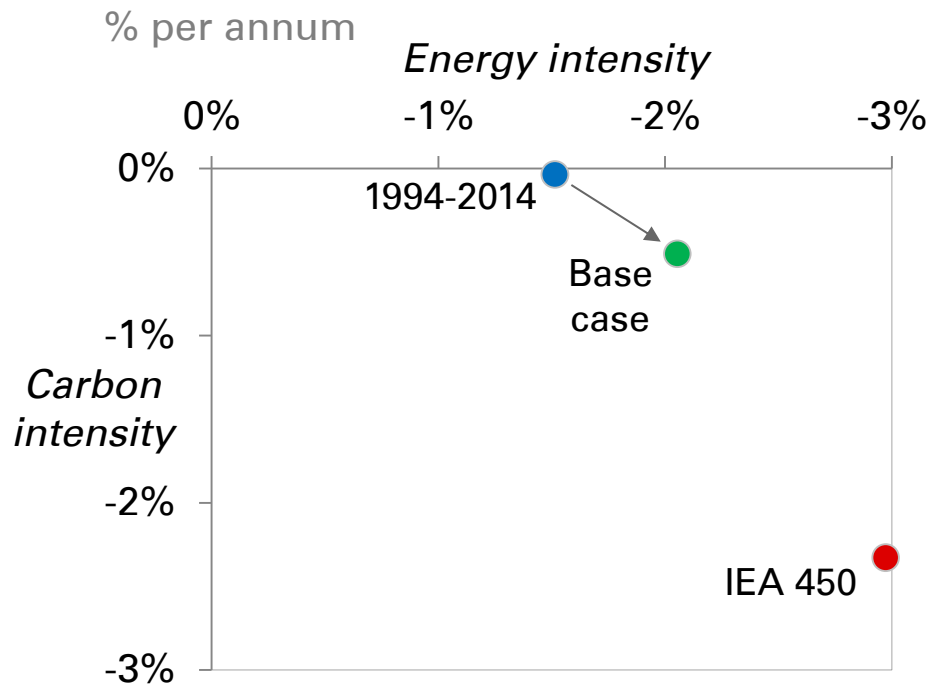


# Outlook for carbon emissions

## Carbon emissions



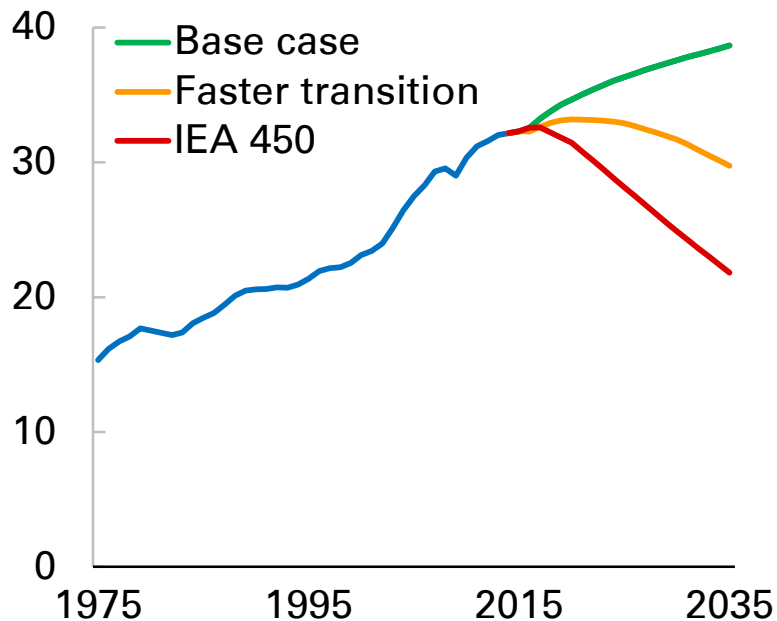
## Changes in intensity



# Outlook for carbon emissions

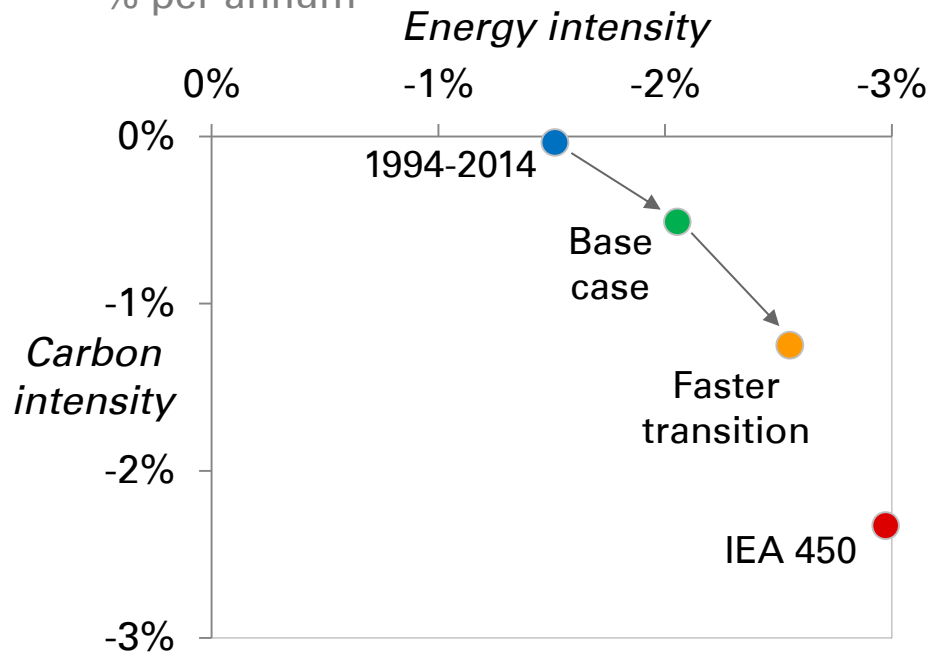
## Carbon emissions

Billion tonnes CO<sub>2</sub>



## Changes in intensity

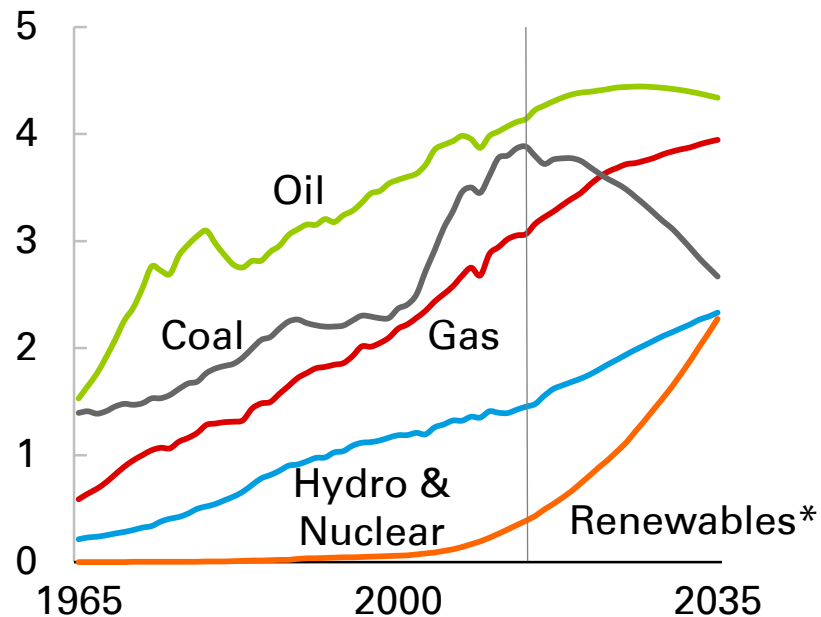
% per annum



# Impact of faster transition case

## Consumption by fuel

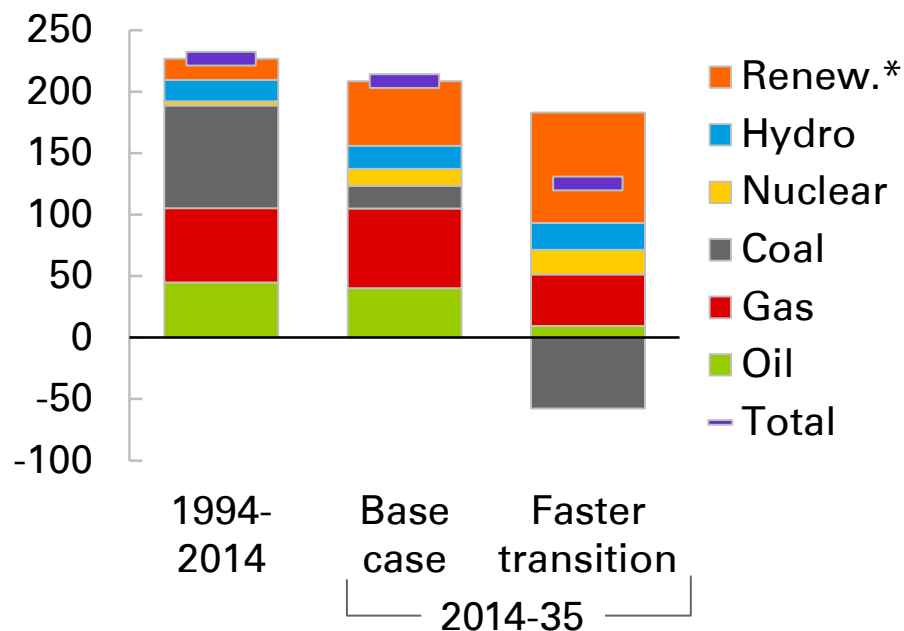
Billion toe



\*Includes biofuels

## Annual demand growth by fuel

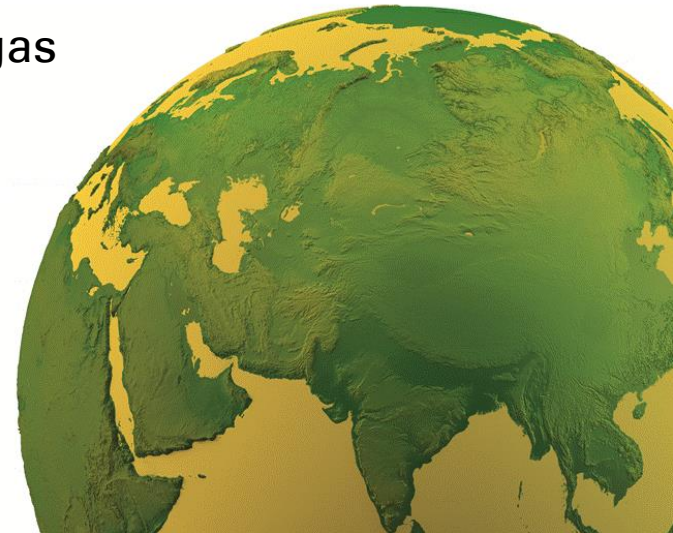
Mtoe per annum



# Conclusions

---

- Global demand for energy continues to rise
  - to power increased levels of activity as the world economy continues to grow
- Fuel mix changes significantly
  - coal losing, renewables gaining, and oil and gas combined holding steady
- Growth rate of carbon emissions slows sharply
  - but further policy changes are needed



# BP Energy Outlook

## 2016 edition



Outlook  
to 2035