



BP Statistical Review  
of World Energy  
68<sup>th</sup> edition and Energy  
Outlook to 2040, 2019  
edition

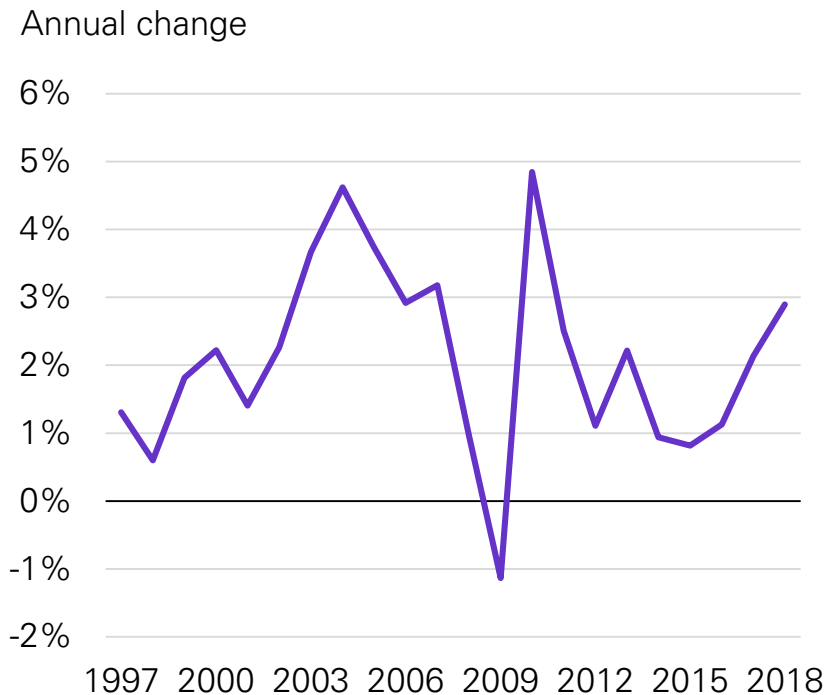
Energy in 2018 and  
through 2040:  
an unsustainable path?

#BPstats

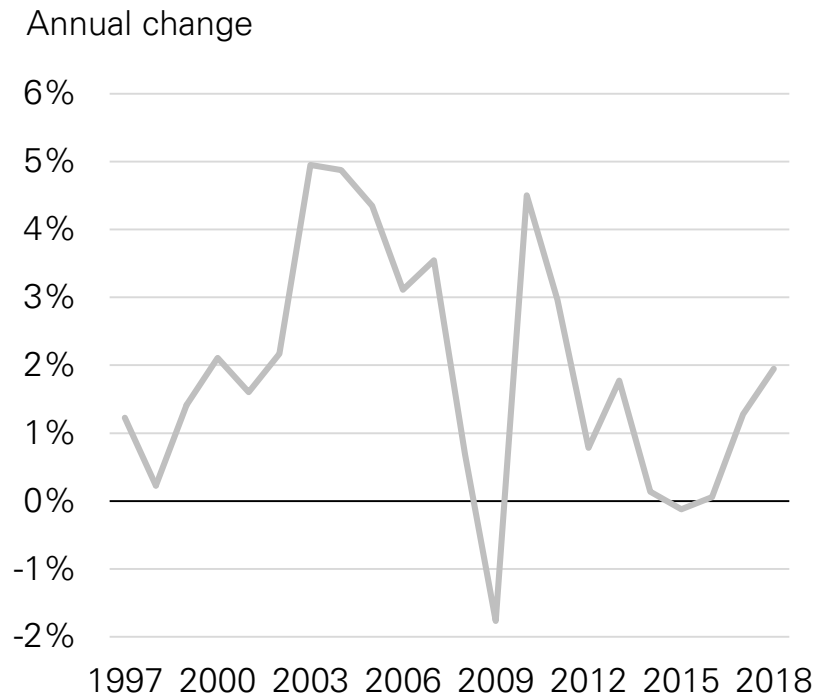
# Growth in primary energy and CO<sub>2</sub> emissions



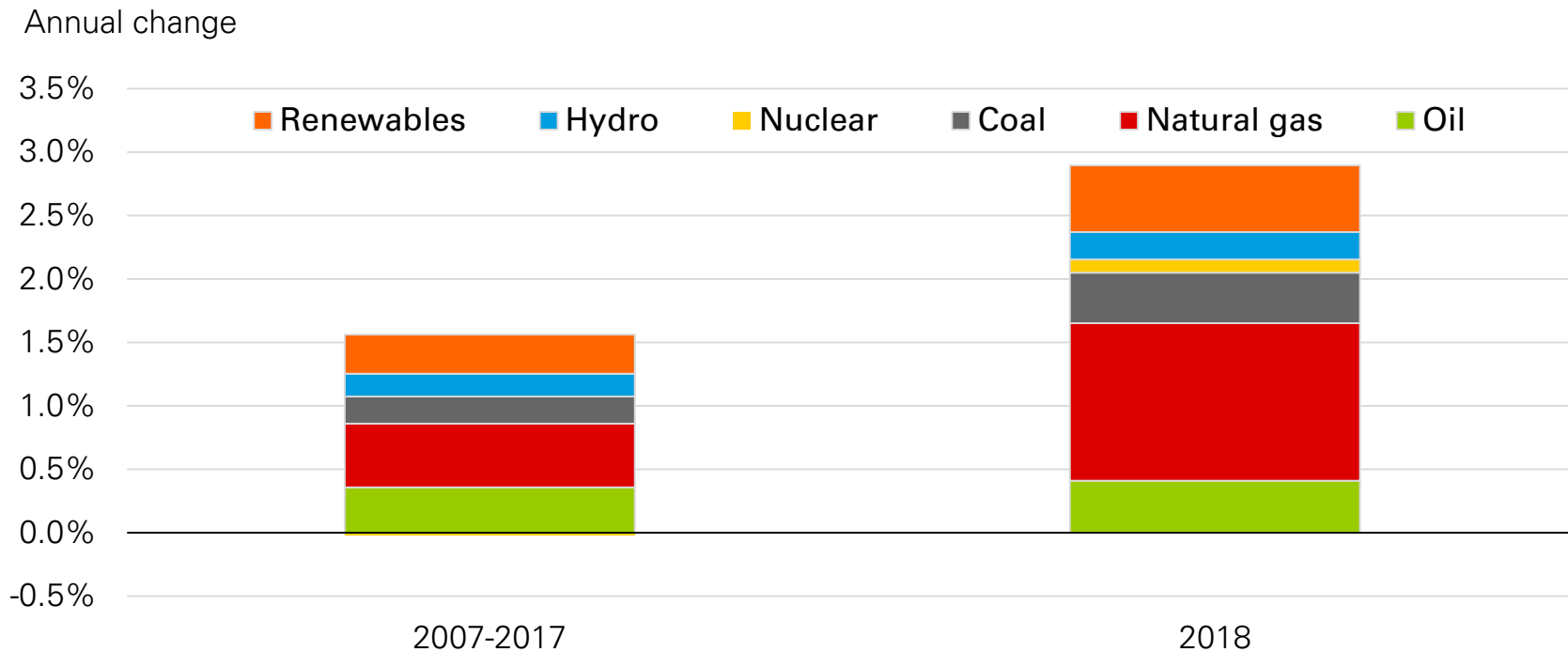
## Primary energy growth



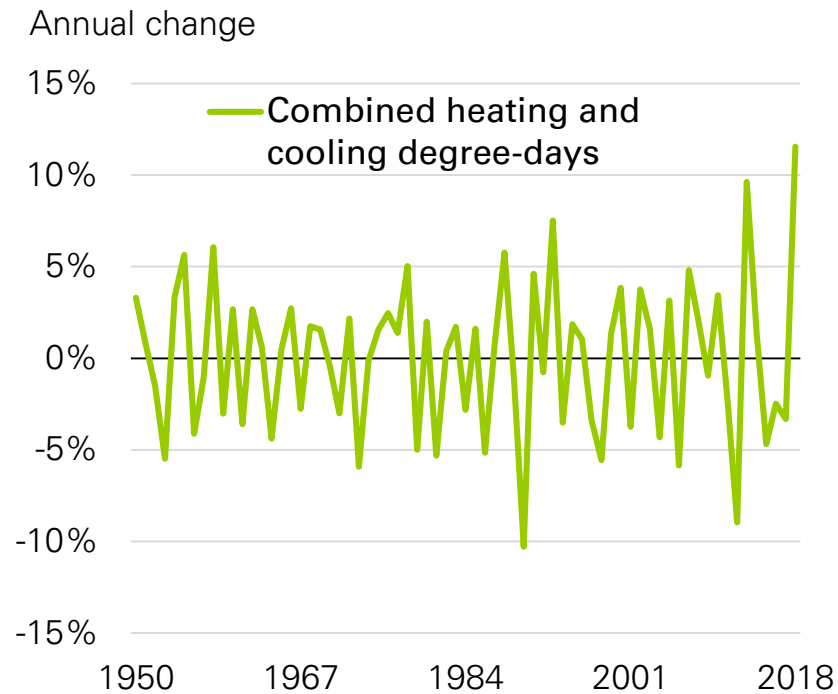
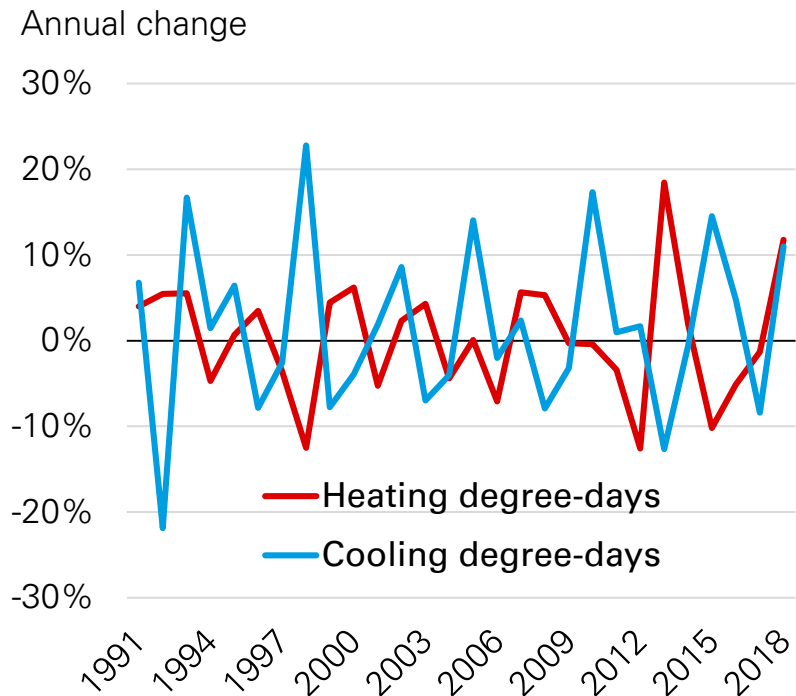
## CO<sub>2</sub> emissions from energy use



# Primary energy growth by fuel



# US heating and cooling days

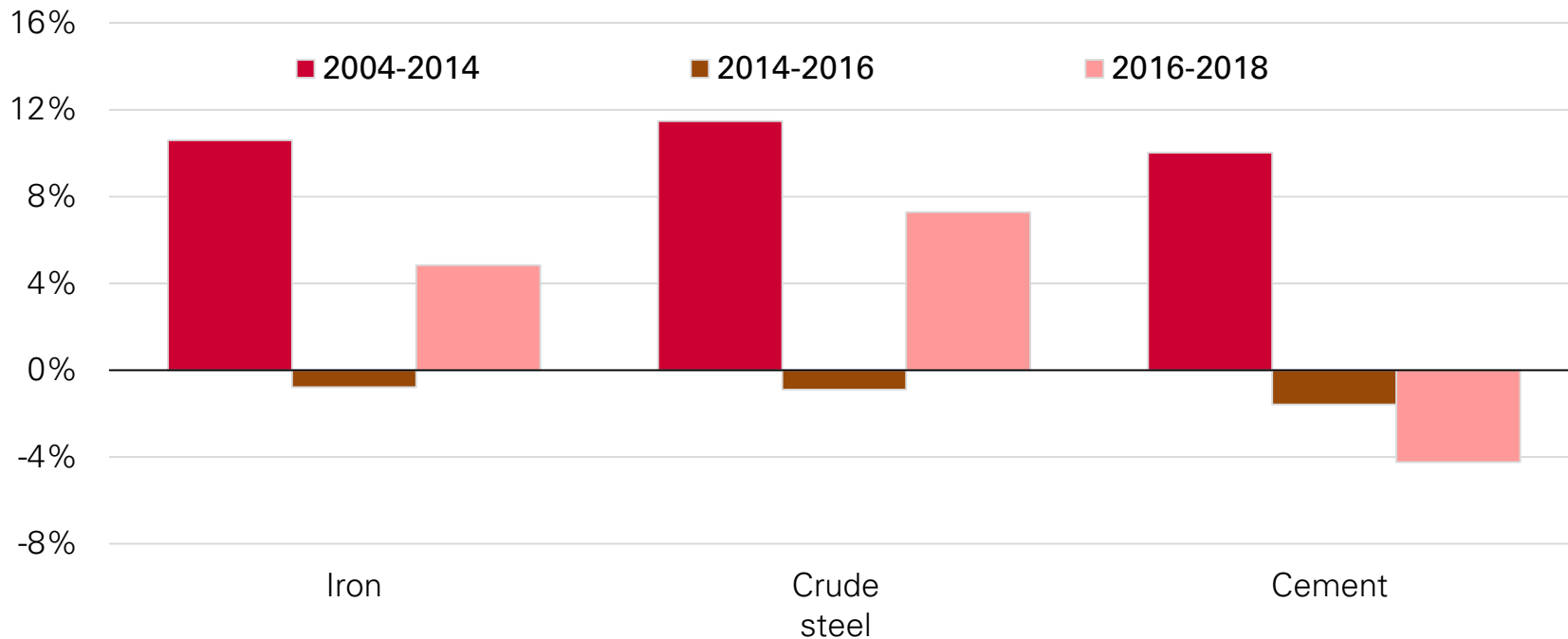


# Chinese industrial growth



## Outputs of iron, steel and cement

Annual change



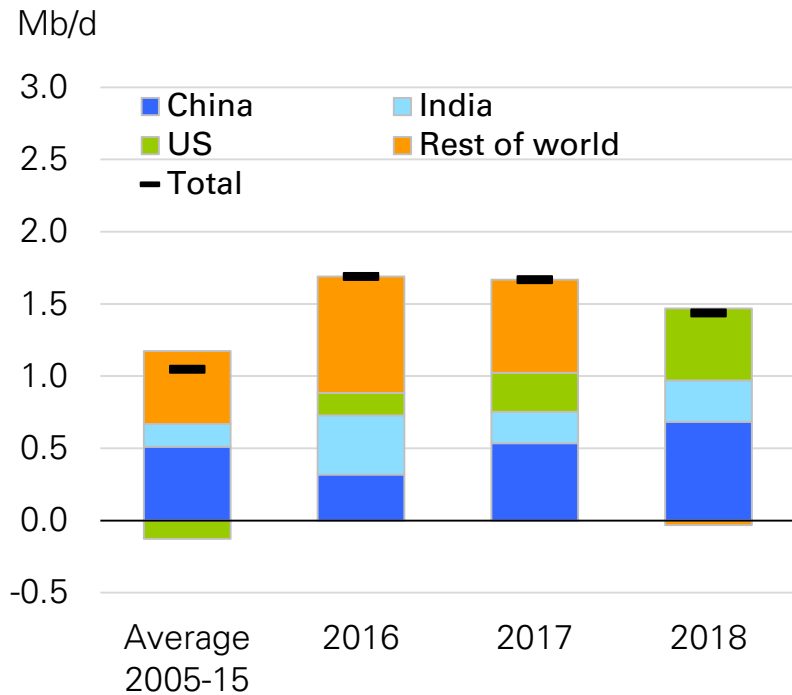


# Oil

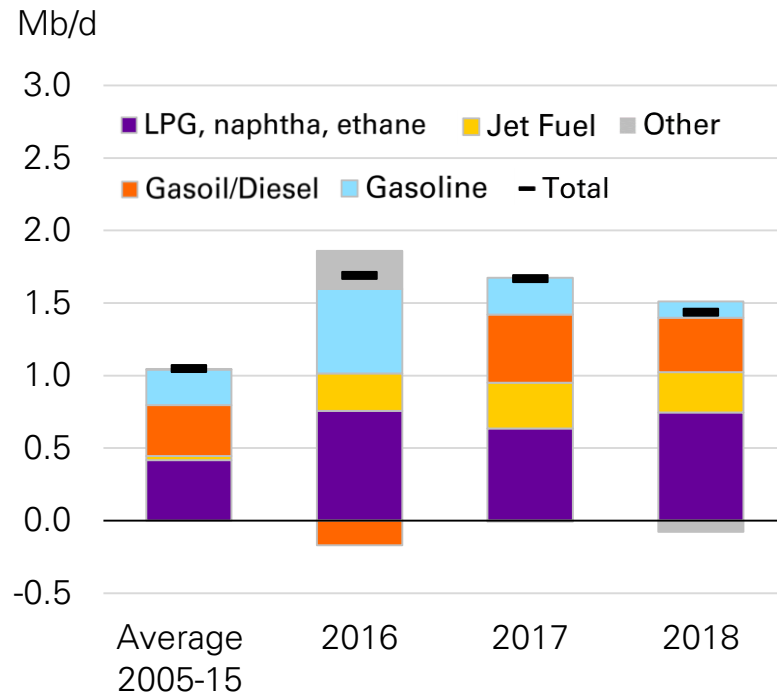


# Oil demand

## Demand growth by region



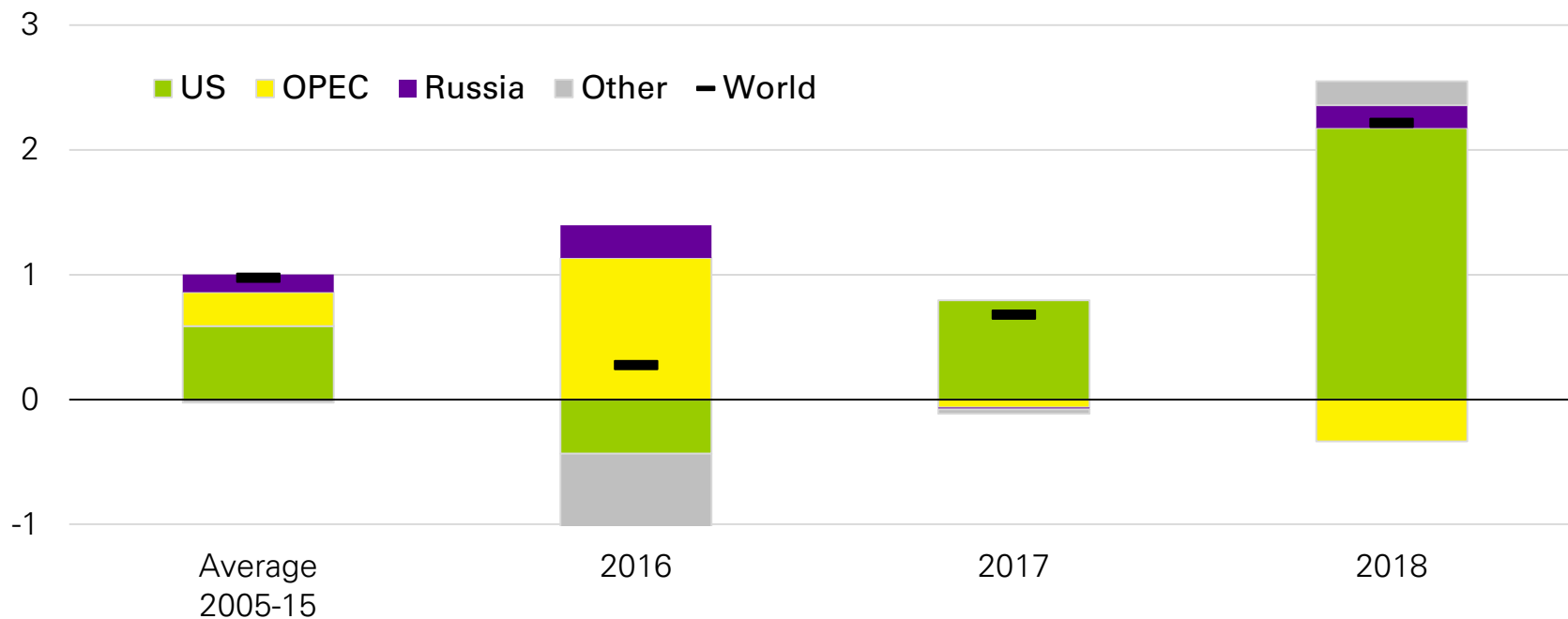
## Demand growth by product



# Oil production



Annual growth, Mb/d

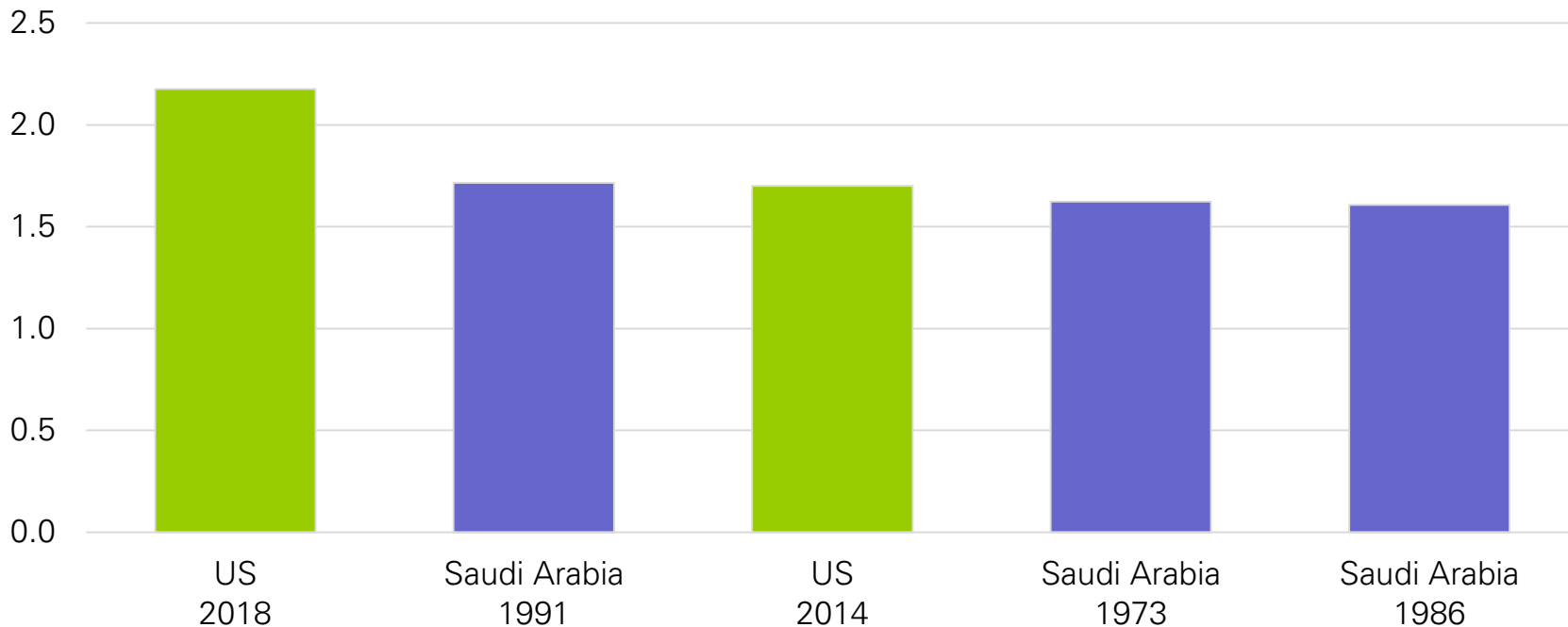






# Largest annual increases in oil production

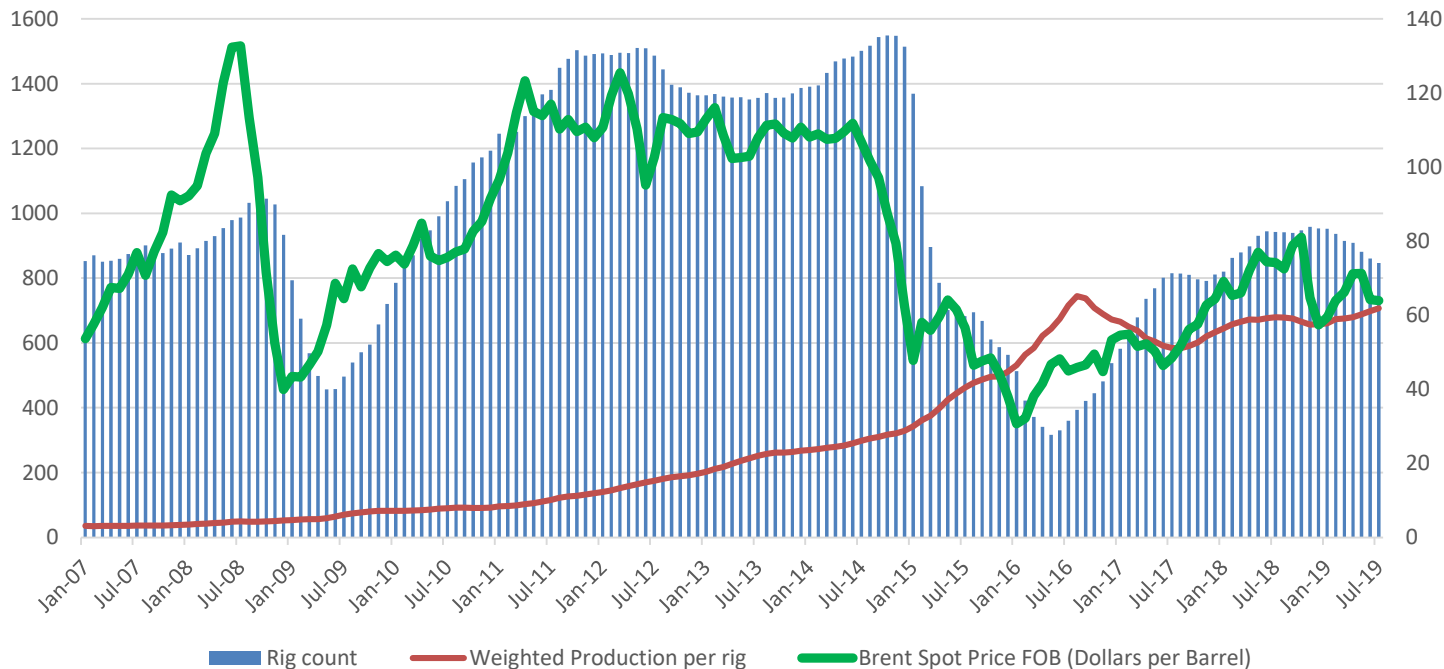
Annual growth, Mb/d



# US oil output has declined, yet has been demonstrating resilience since September 2015



Units Kbd

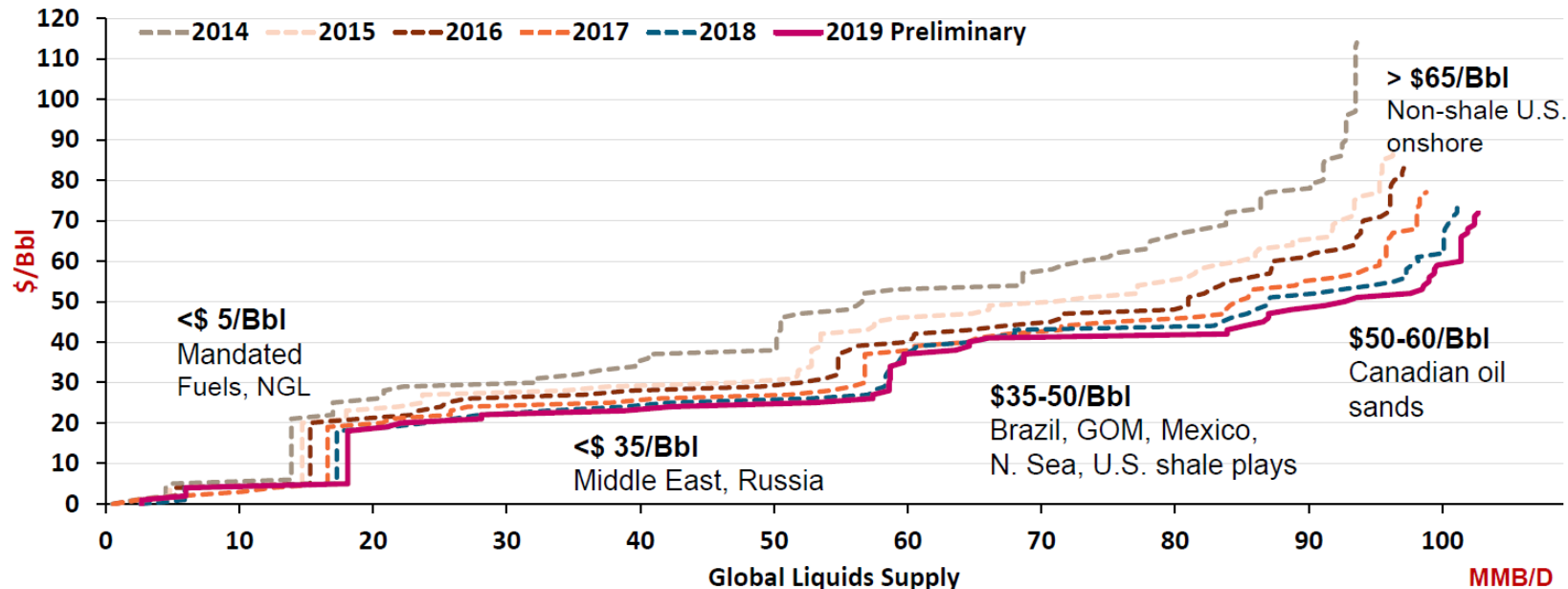


Source: US EIA

# Oil cost curve keeps shifting to the right



**Brent-equivalent development costs**



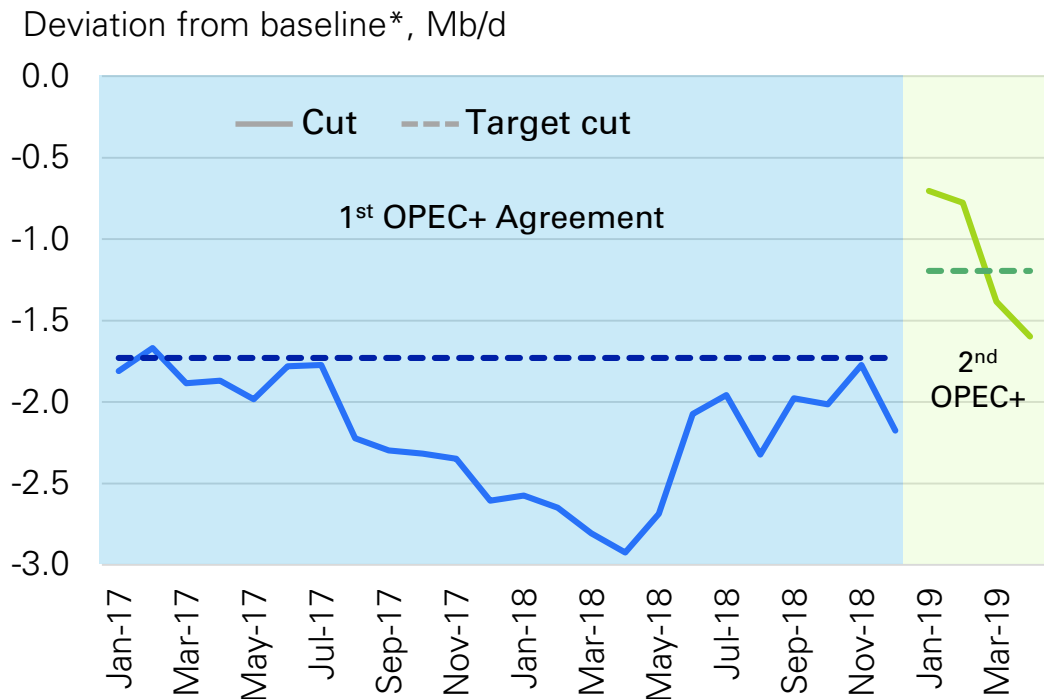
S&P Global  
Platts

Development costs represent the cost to develop and operate production. Half cycle costs displayed above exclude sunk costs. Full cycle costs include sunk costs (lease acquisition, seismic, appraisal drilling, processing facilities, gathering lines, etc.). Operating costs are deducted on a discounted basis. Taxes are included. A 10% return on investment is assumed.

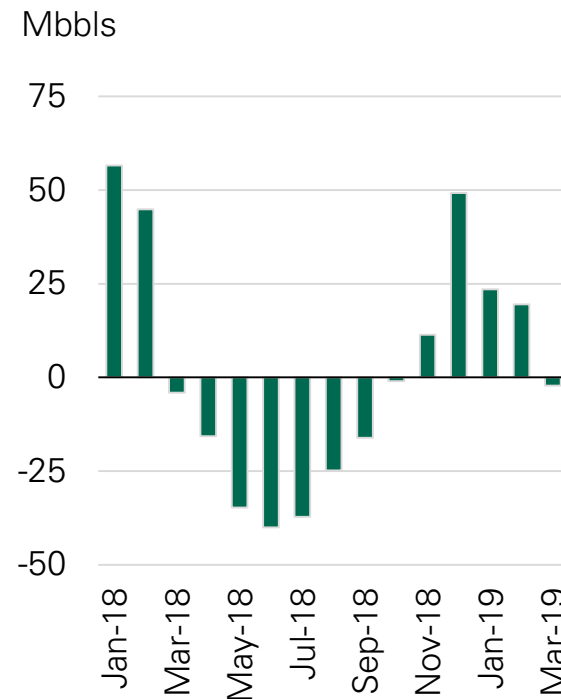


# OPEC+ production agreements and OECD oil stocks

## Oil production



## OECD stocks: deviation from 5-year moving average



\*Baseline in the 1st OPEC+ Agreement was October 2016.  
For the 2nd OPEC+ Agreement it was October 2018

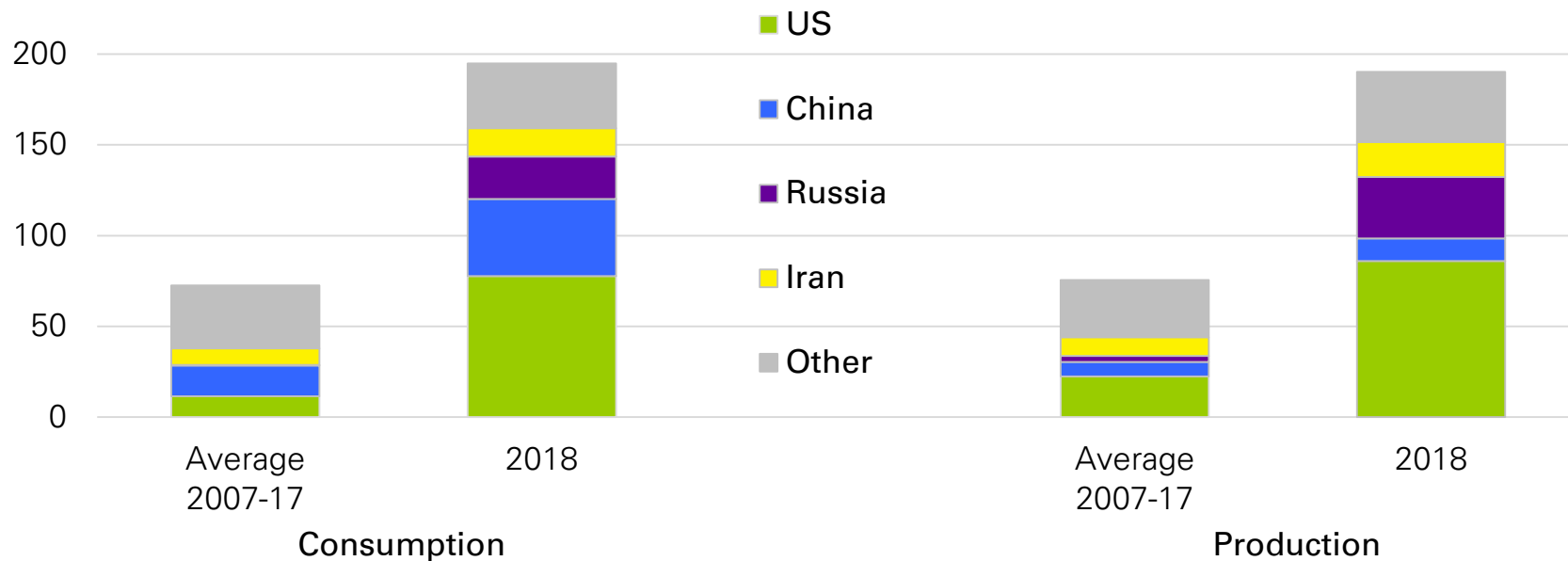


# Natural gas

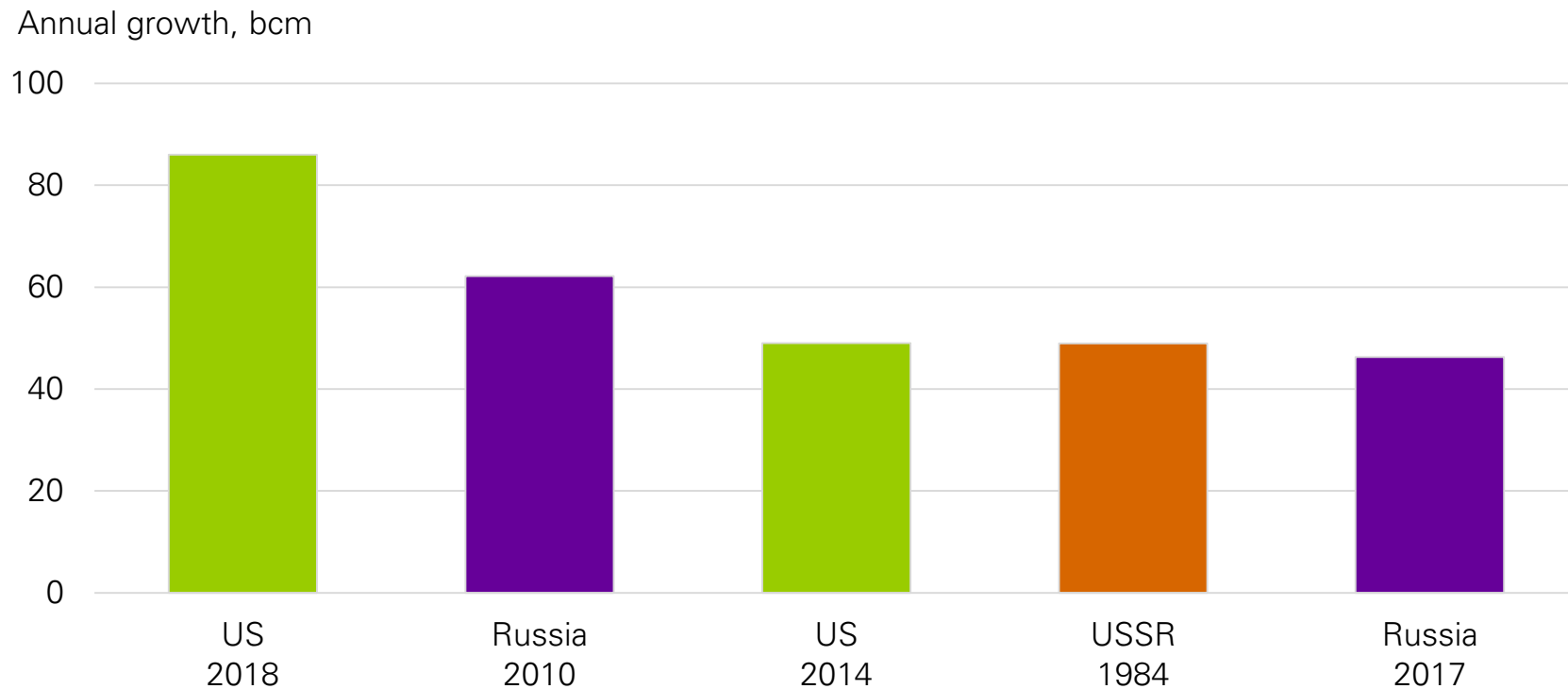
# Global growth in natural gas



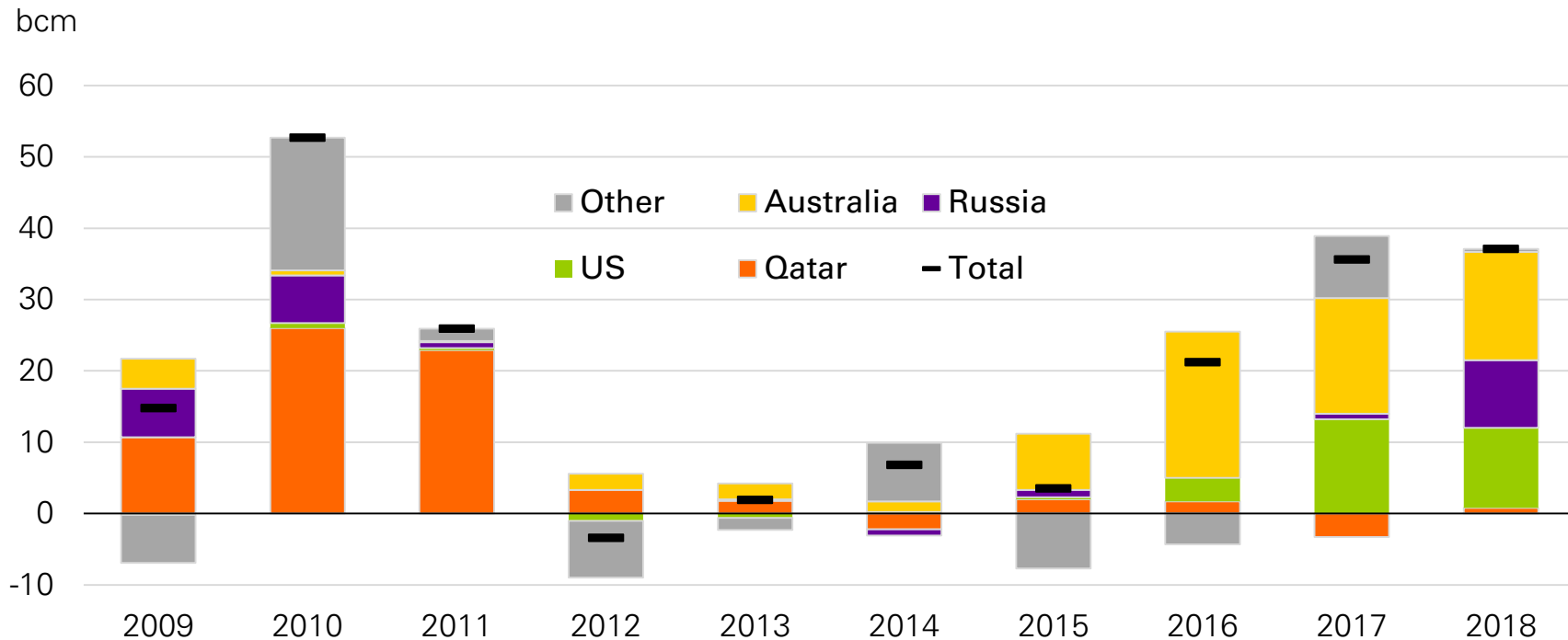
Annual change, bcm



# Largest increases in gas production



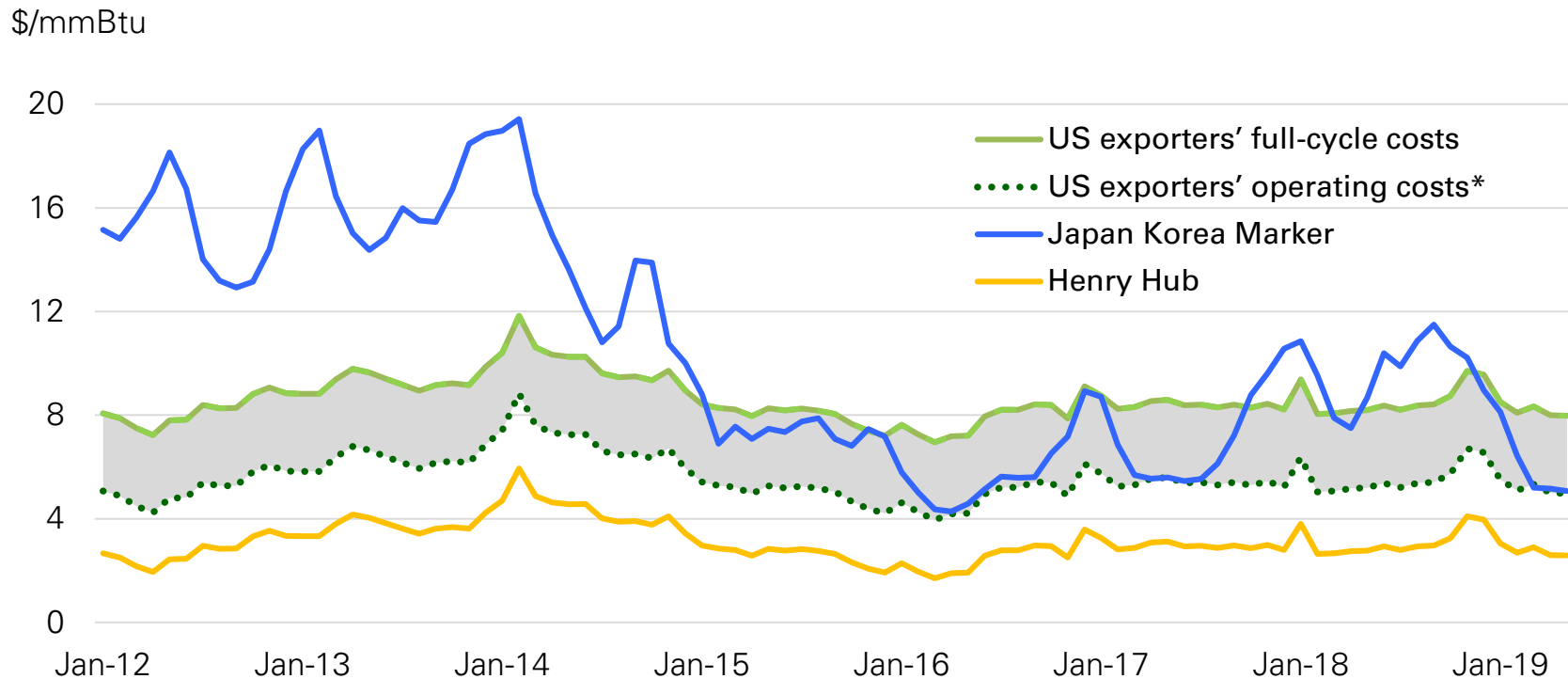
# Annual increase in LNG exports







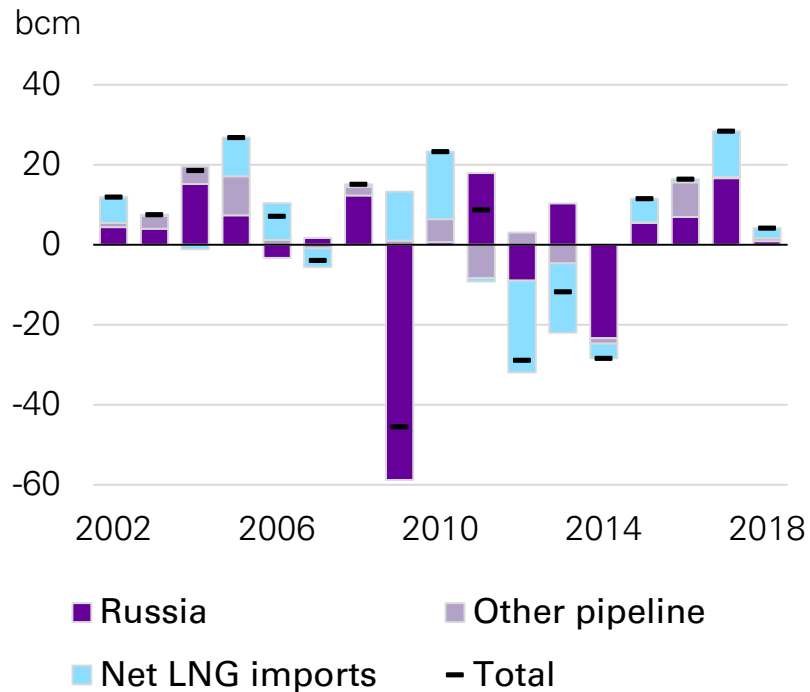
# US LNG exporters' costs & Asian spot prices



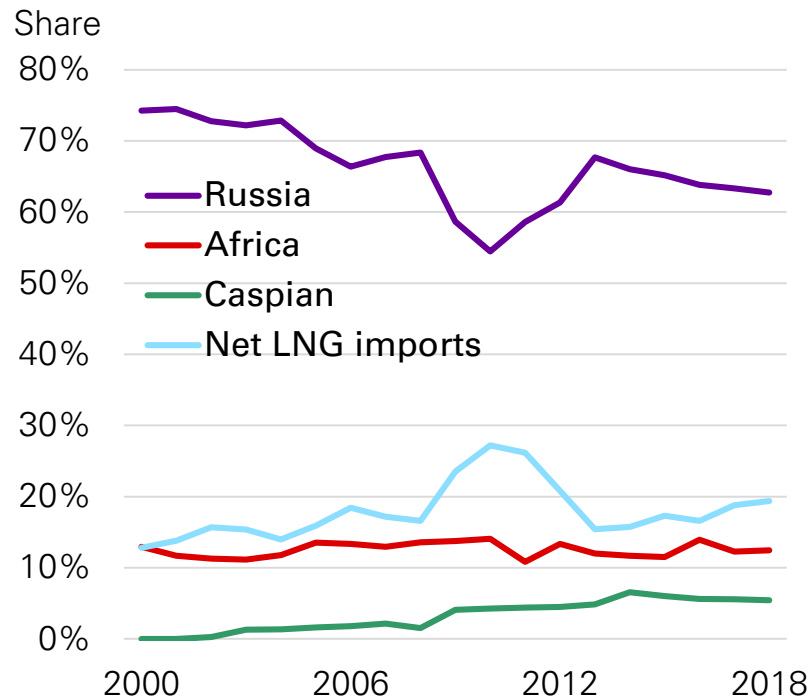
\* Operating costs = 1.15\* Henry Hub + \$2/mmBtu (transport) ; Full costs also include liquefaction fee (\$3/mmBtu)

# European gas imports

## Growth in European gas imports



## European gas imports by source



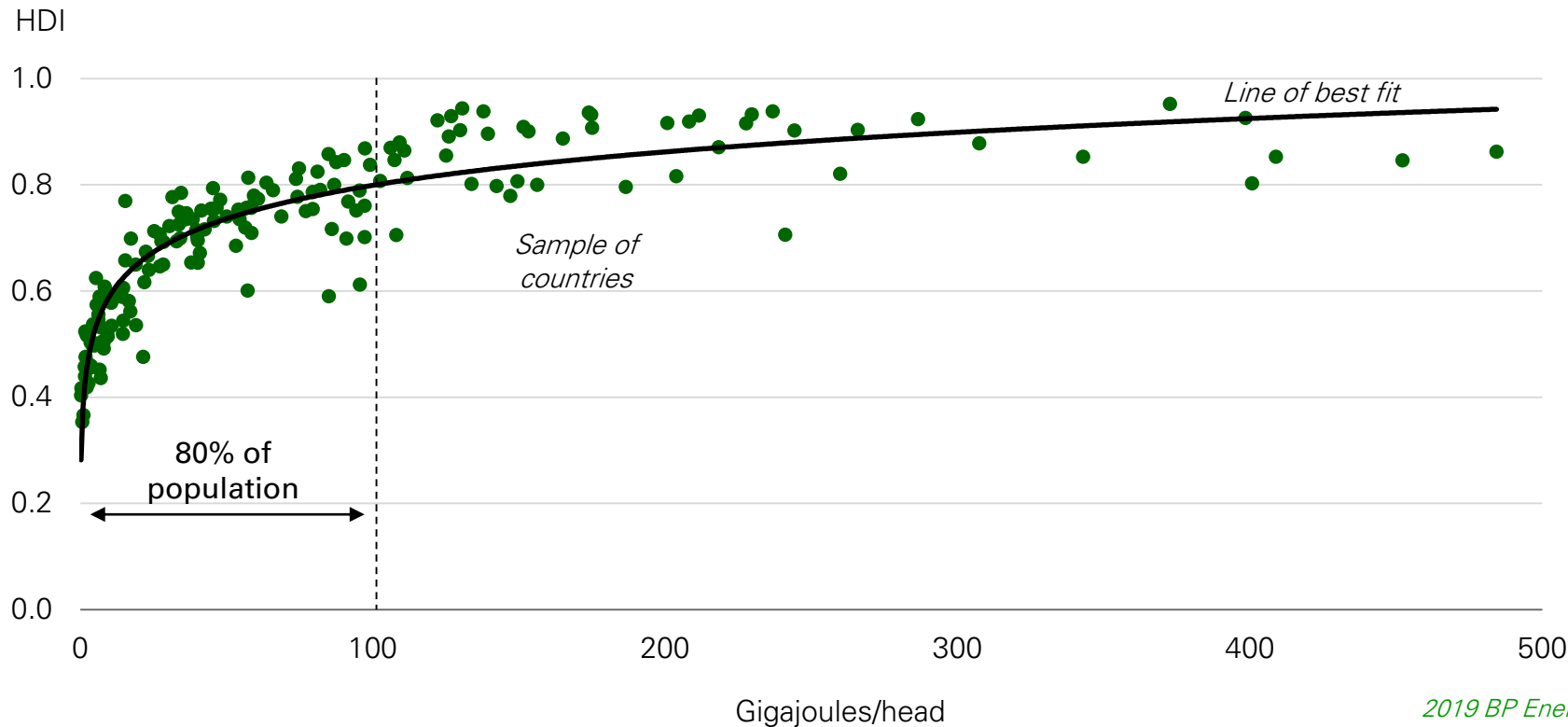


# Outlook to 2040



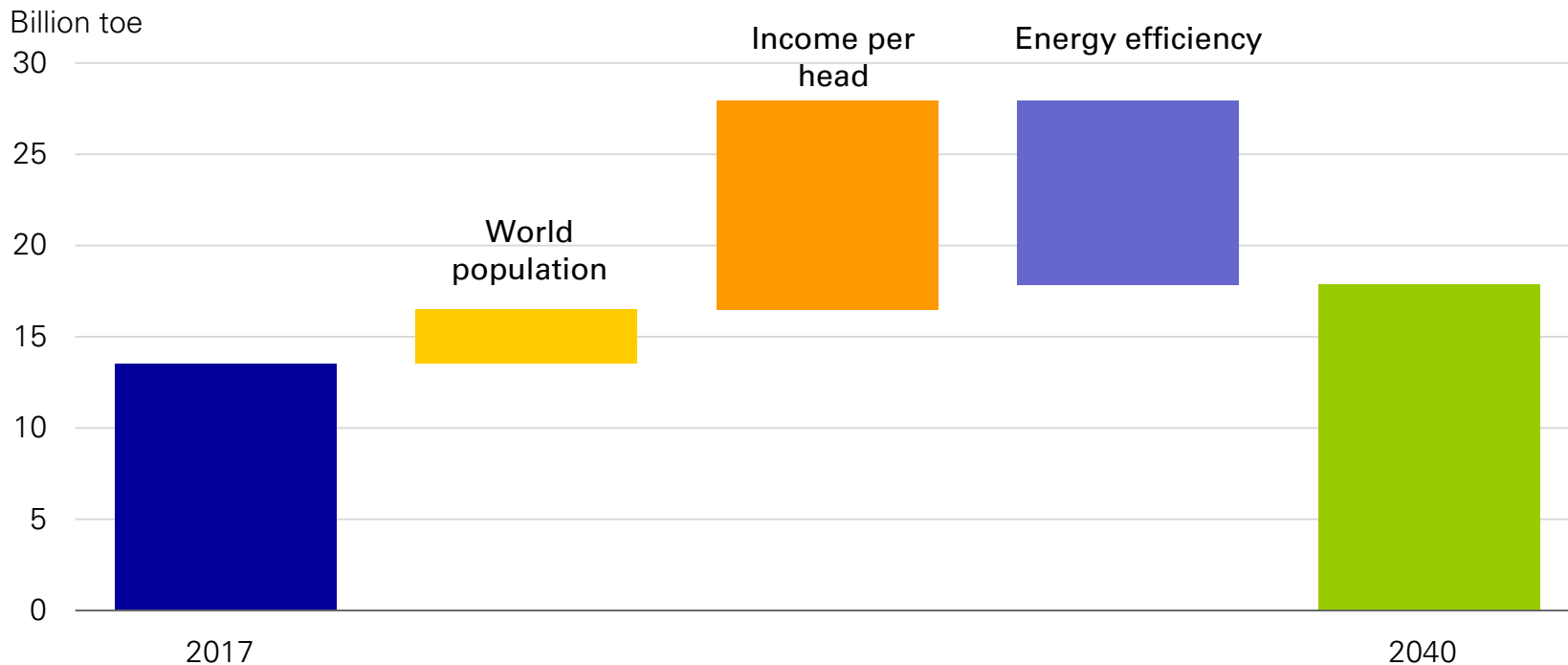
# Human development and energy consumption

UN Human Development Index and energy consumption, 2017



# Increase in primary energy demand

Increase in primary energy demand, 2017-2040

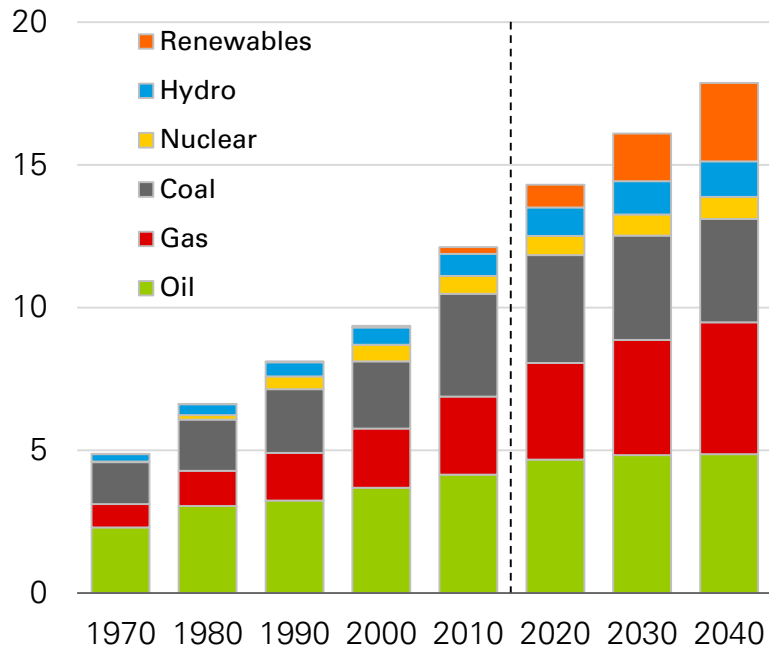


# Global energy by fuel type

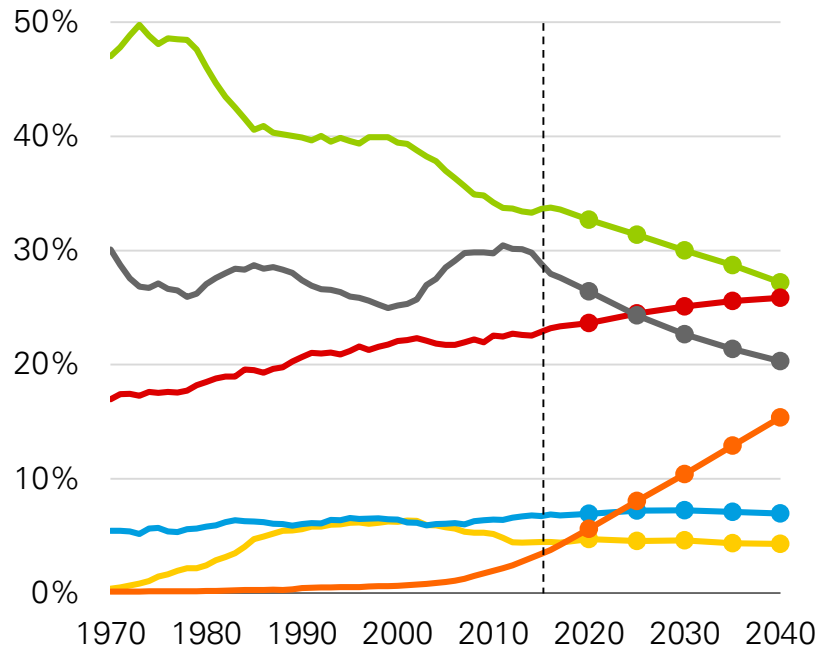


## Primary energy consumption by fuel

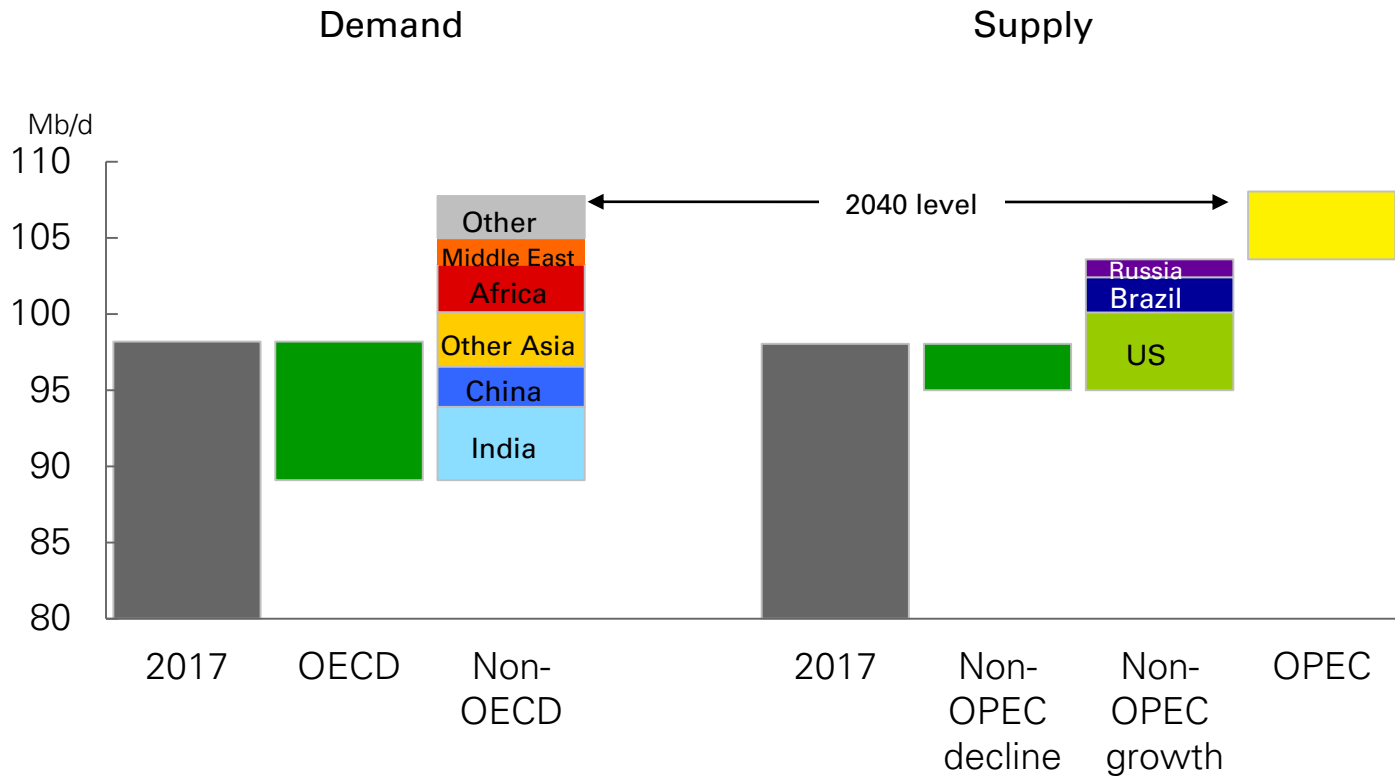
Billion toe



## Shares of primary energy

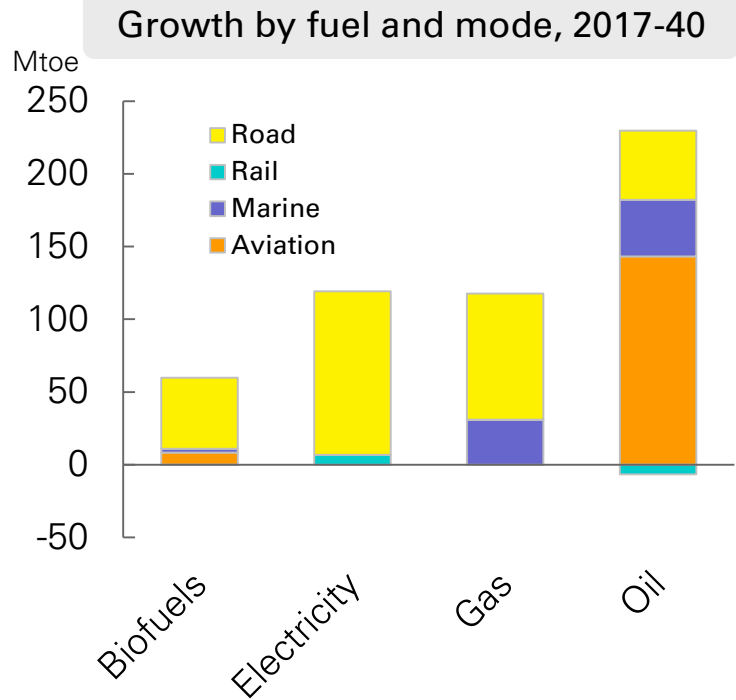
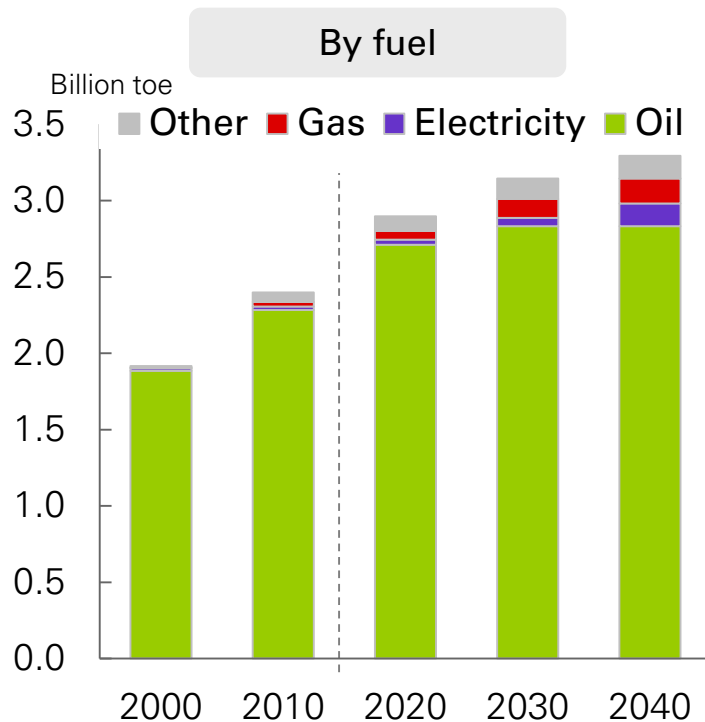


# Growing demand for liquid fuels in emerging economies



# Transport demand continues to be dominated by oil

## Transport energy consumption:

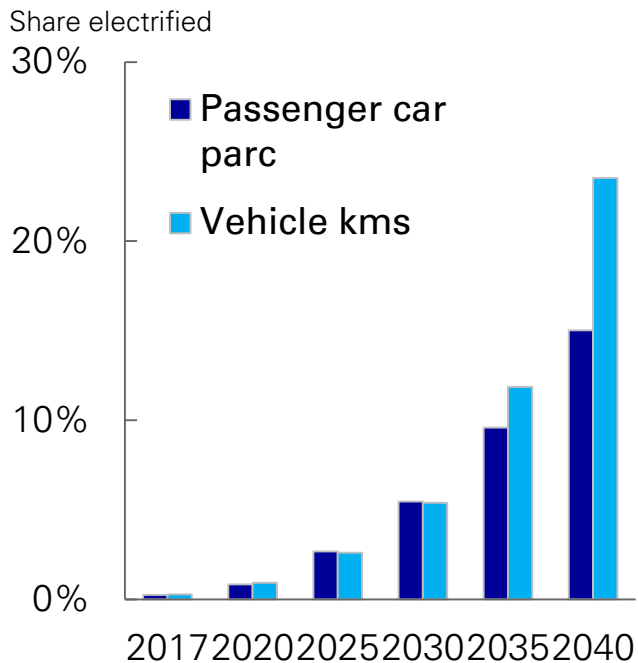


Other includes biofuels, coal and hydrogen

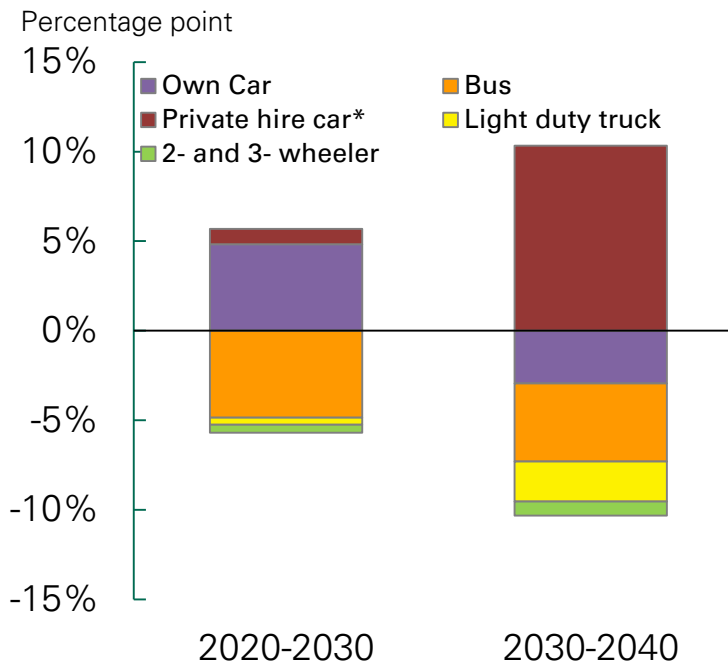


# Electric vehicles continue to grow rapidly

### Passenger car parc and vehicle kms electrified



### Change in the share of road passenger kms

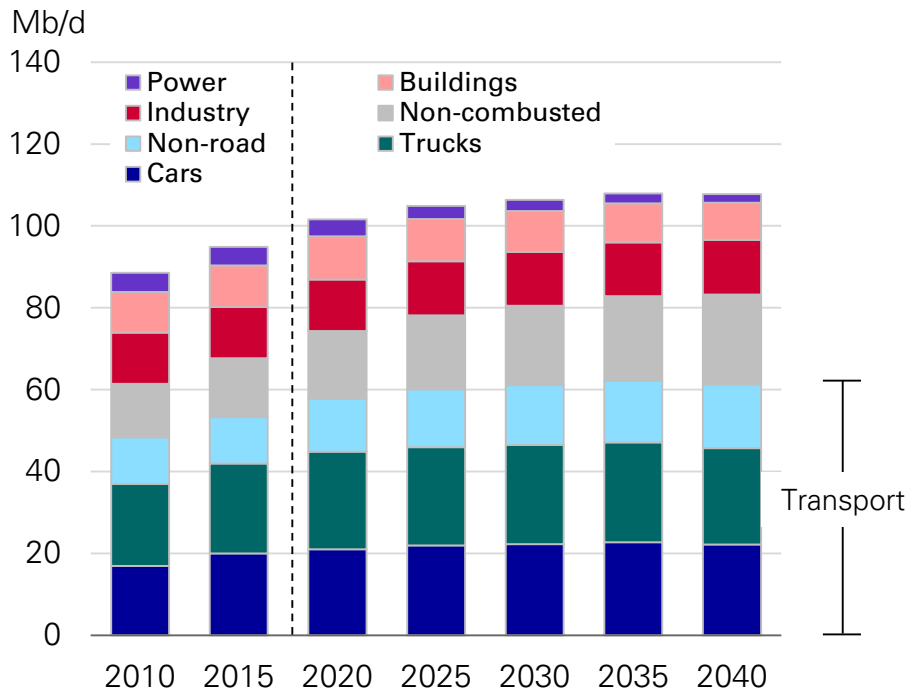


\*Includes all forms of taxis

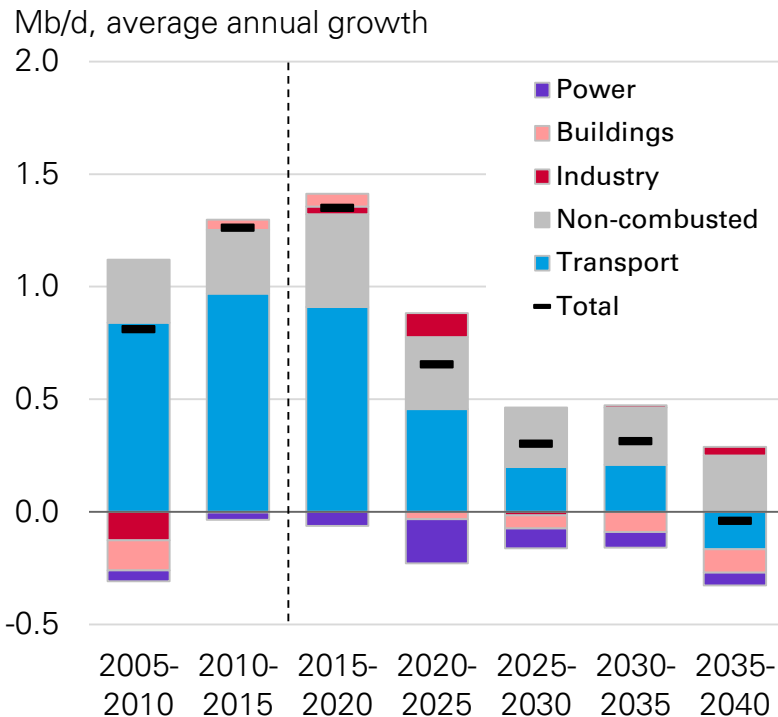


# Demand for oil and other liquid fuels

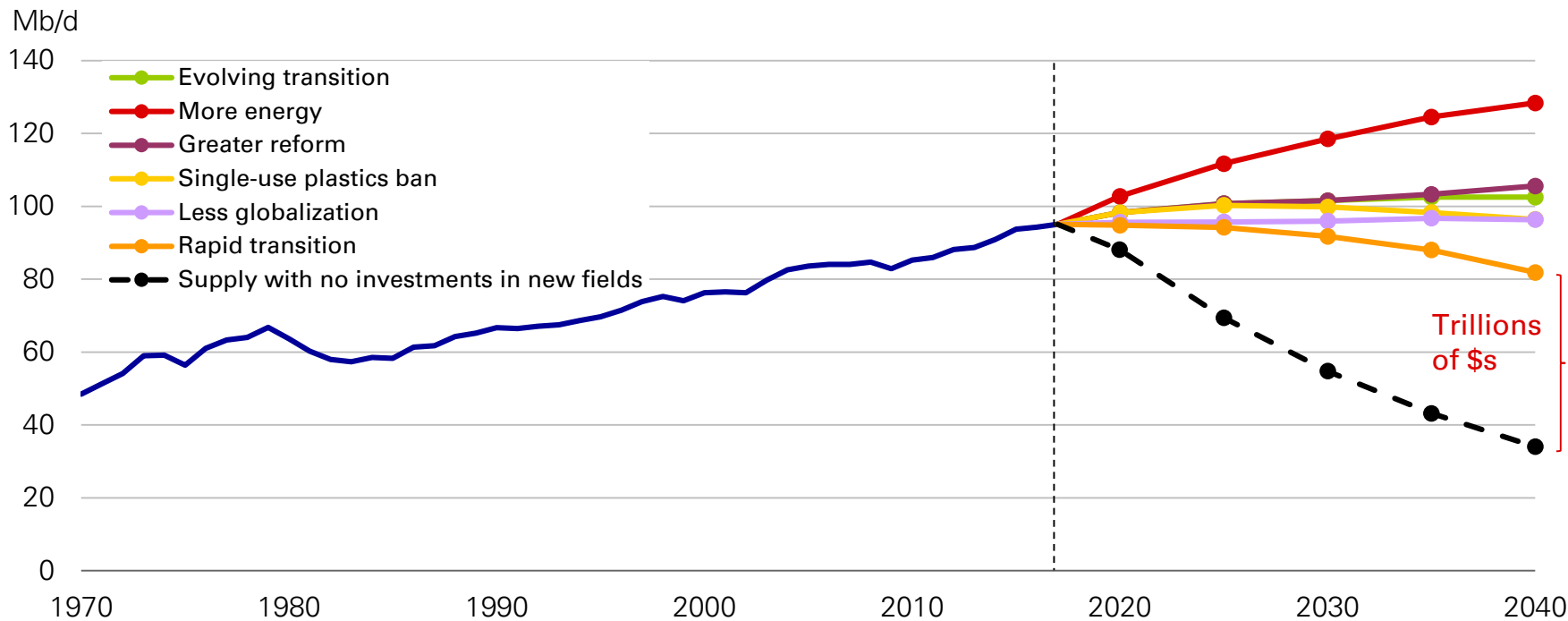
## Liquids demand



## Liquids demand growth

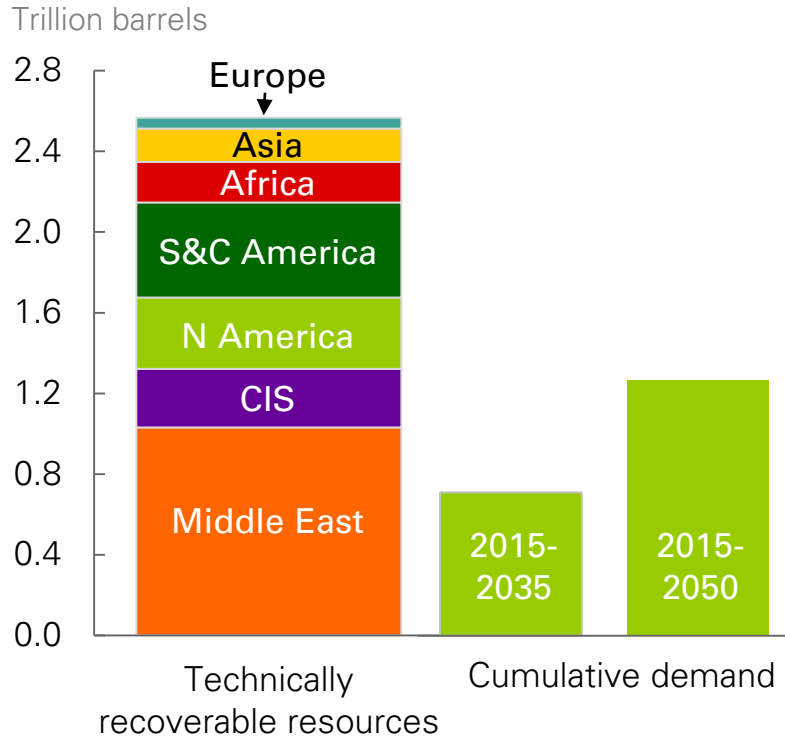


# Demand and supply of oil



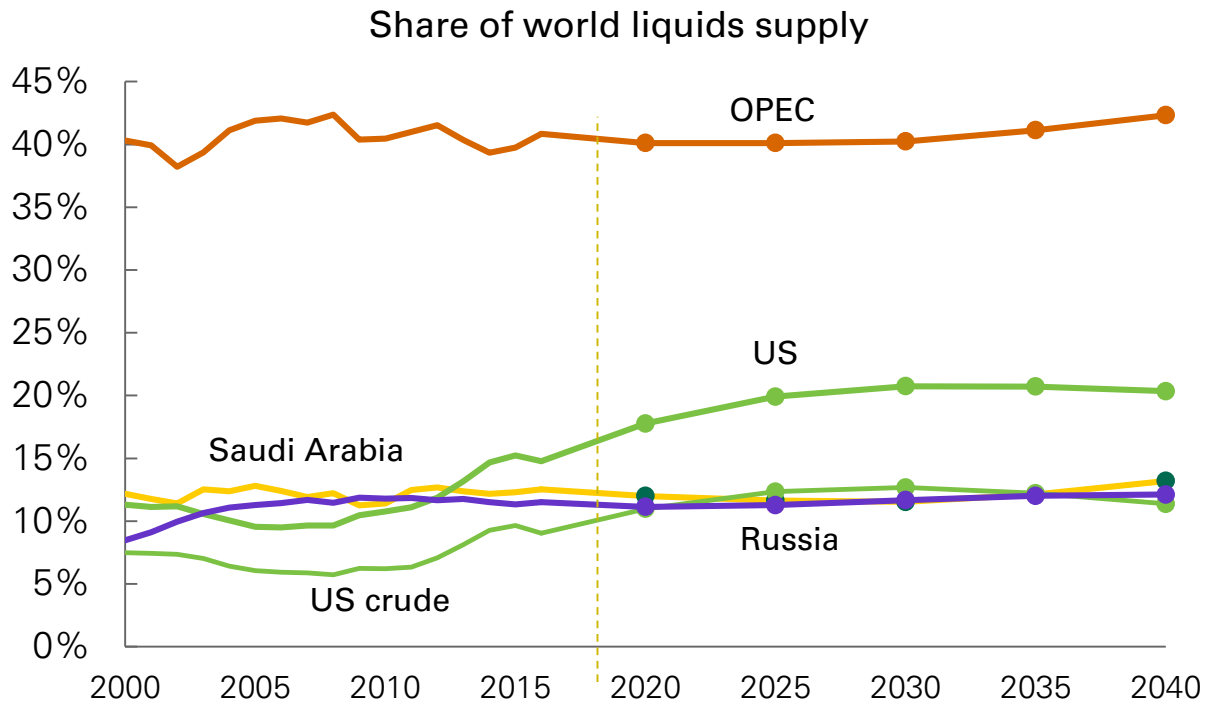
# Abundance of oil resources

Estimates of technically recoverable resources and cumulative oil demand





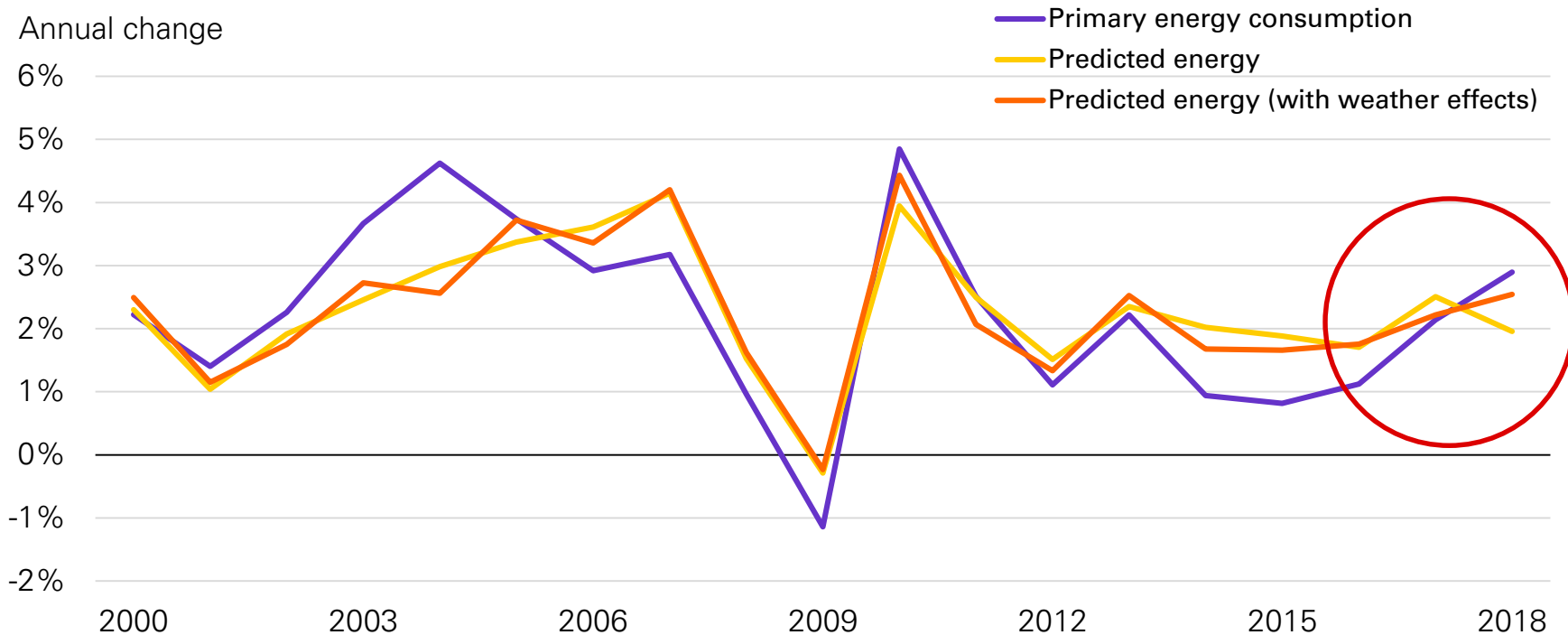
# Global liquids supply growth will likely be led by low-cost producers



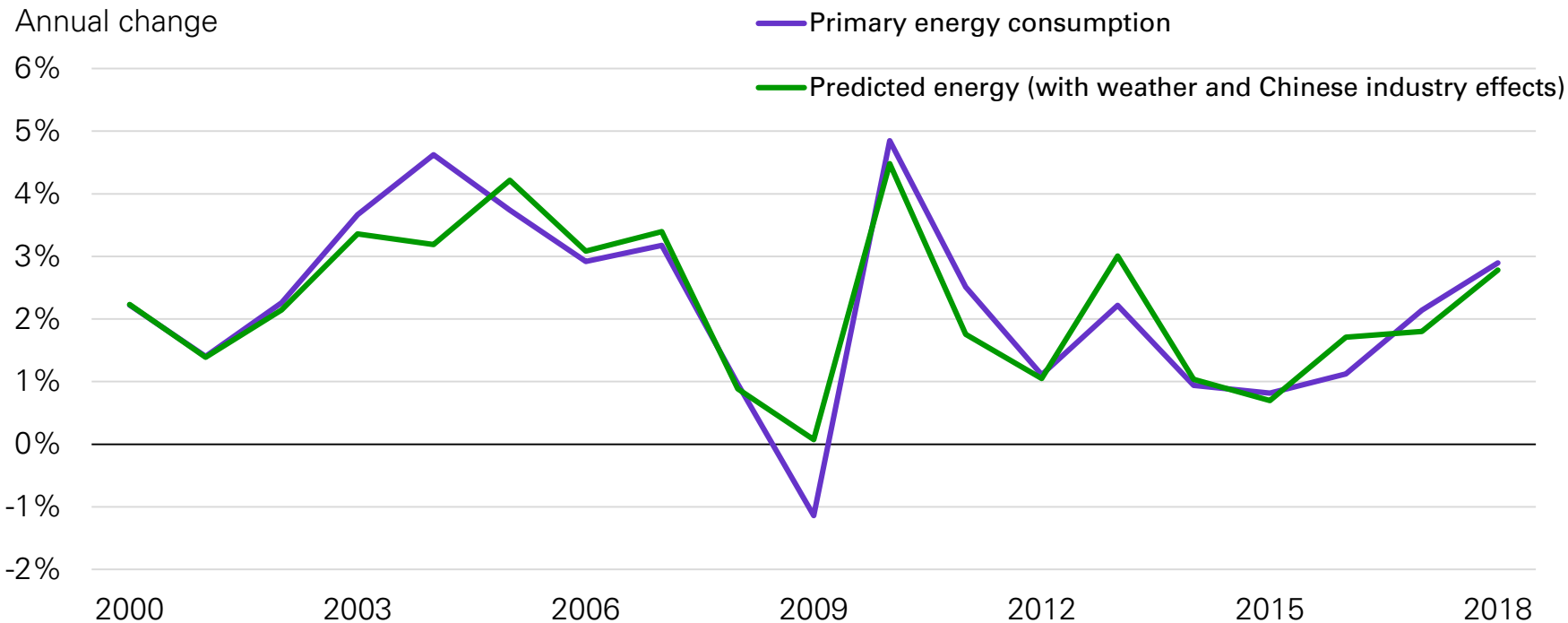


# Back-Up

# Global energy consumption growth



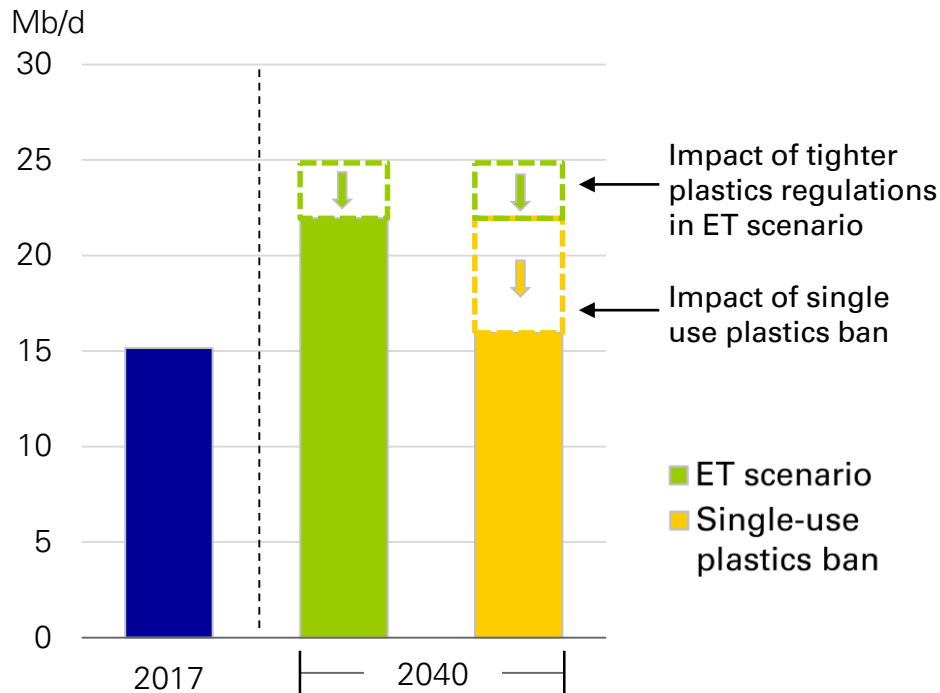
# Global energy consumption growth



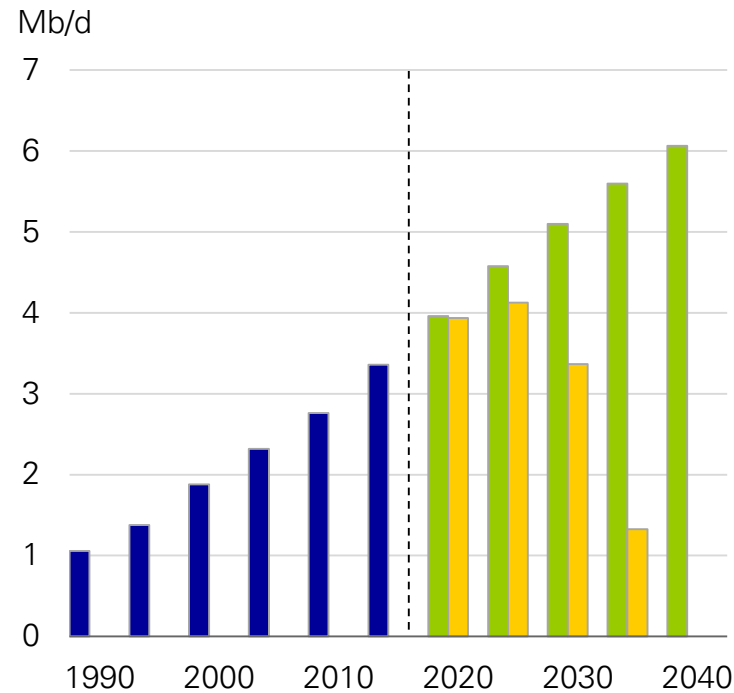


# Demand for liquid fuels and plastics

## Demand for non-combusted liquid fuels

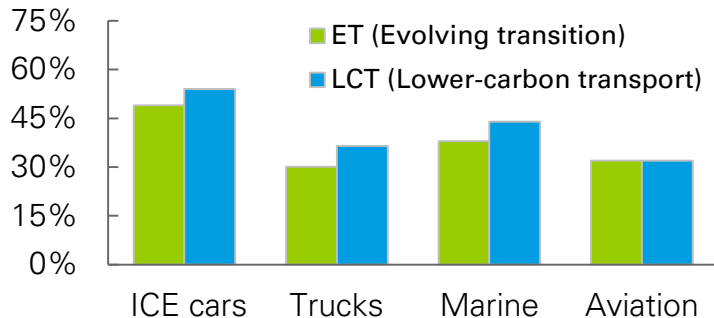


## Liquid feedstocks for single-use plastics

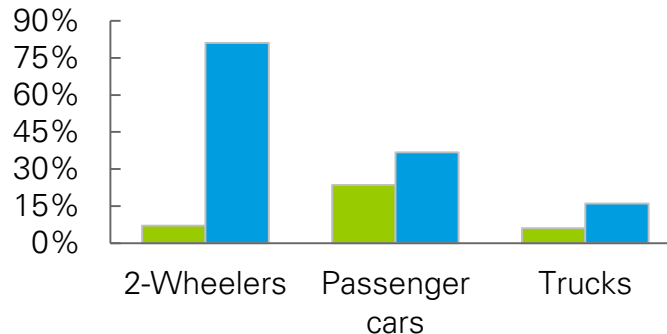


# Alternative scenario: lower-carbon transport sector

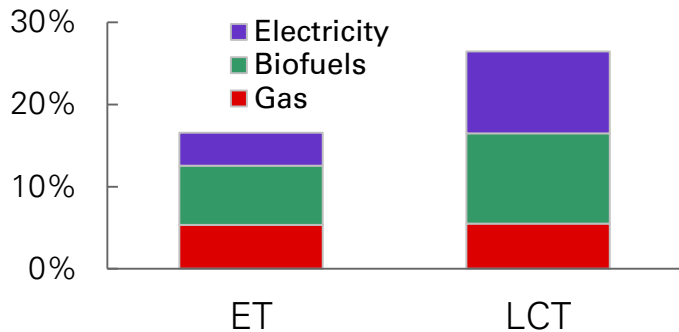
Efficiency improvements 2017 – 2040 (%)



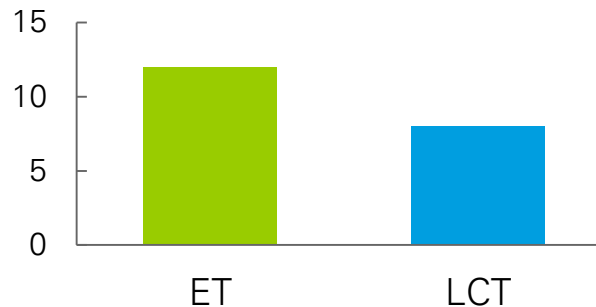
Electrification of Vehicle kms by 2040 (%)



Share of non-oil road transport by 2040 (%)

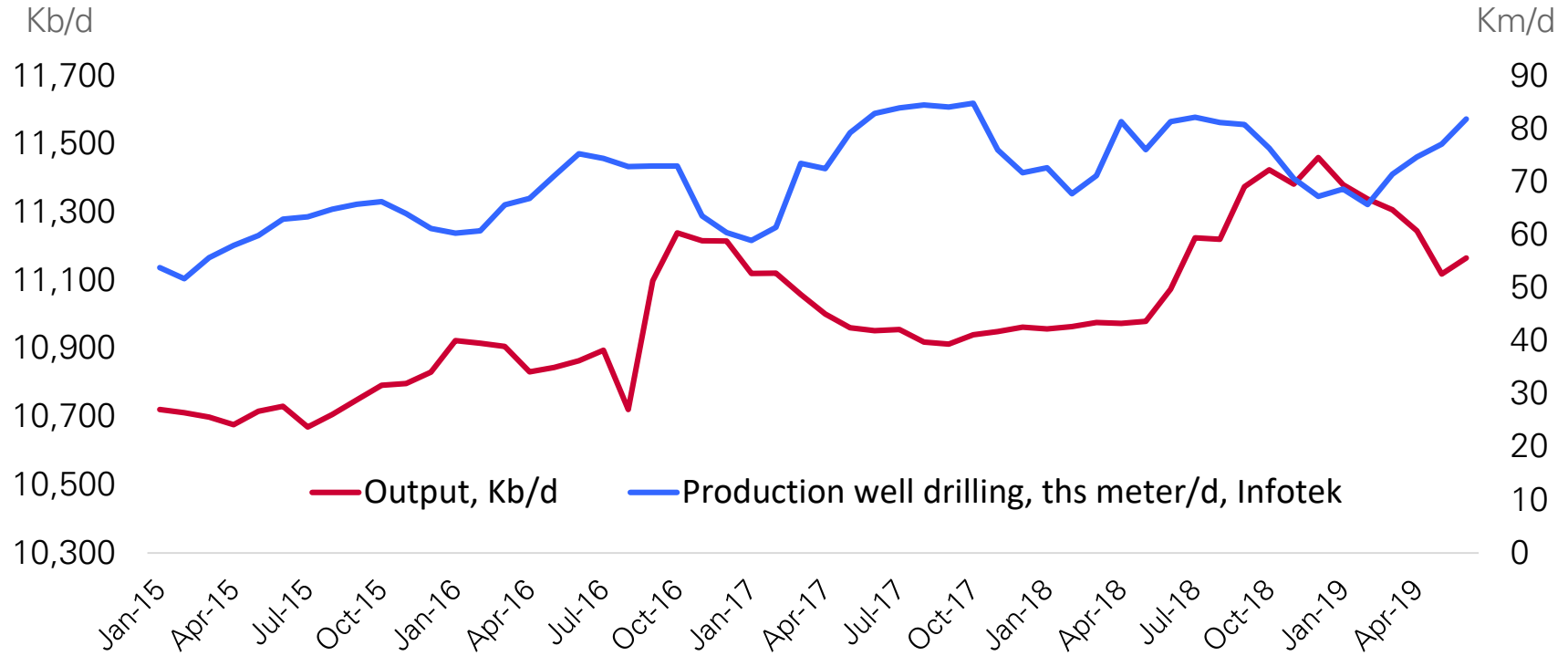


Typical car-lifespan (years)

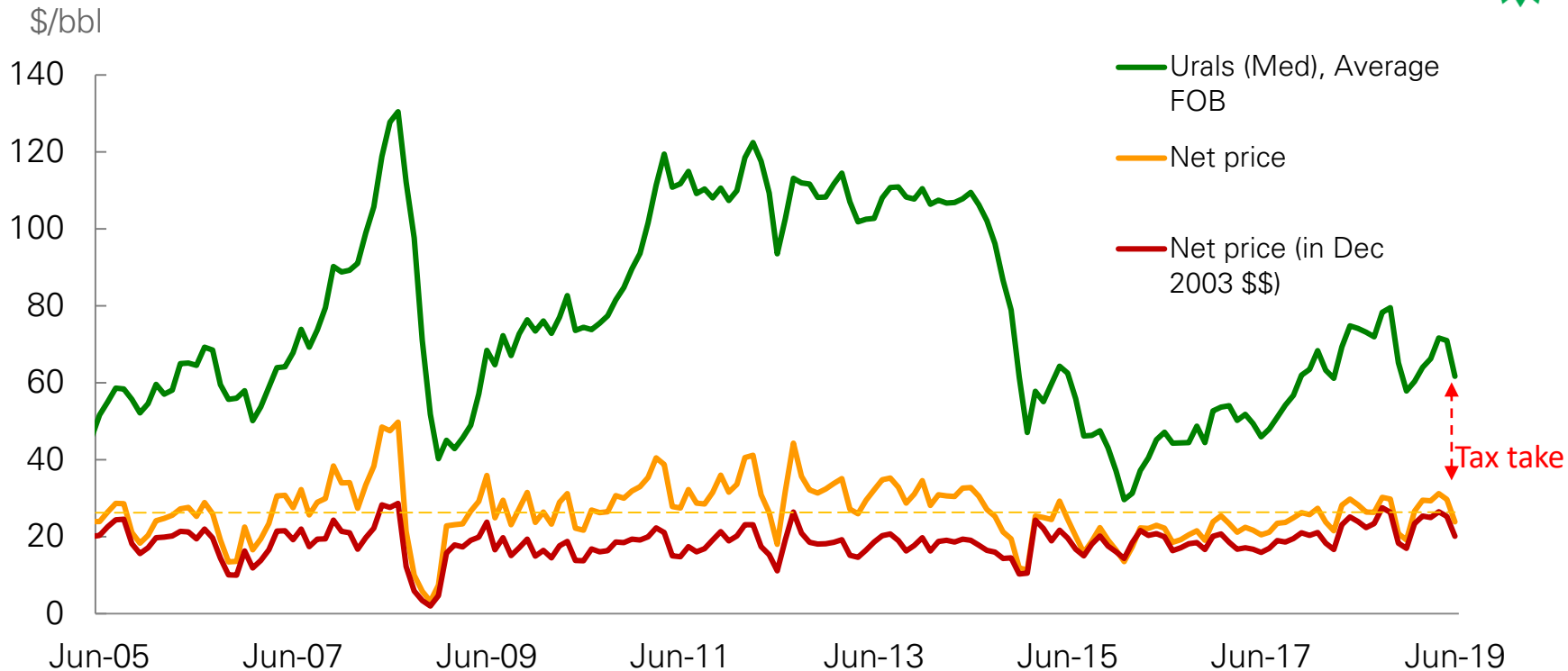




# Russian crude production



# Fiscal regime makes cash flow per barrel fairly stable

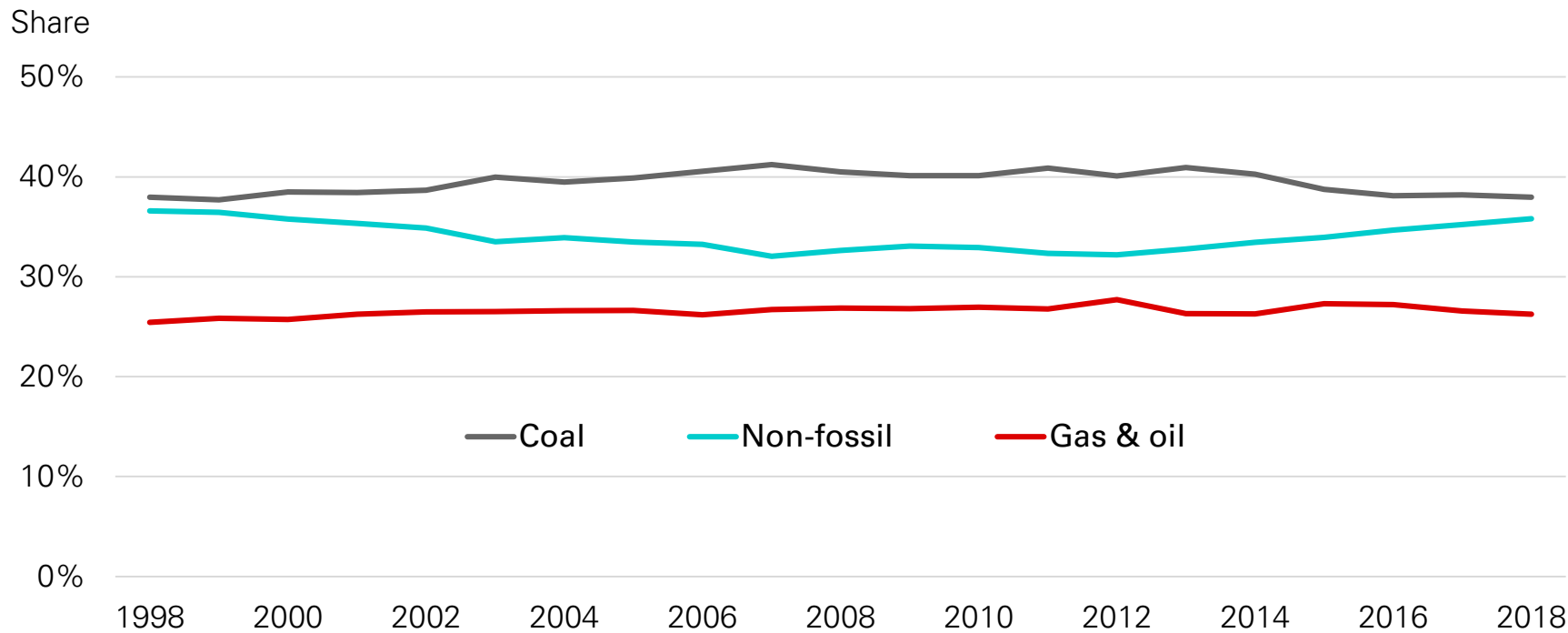


\* Net of Export duty and Mineral extraction tax

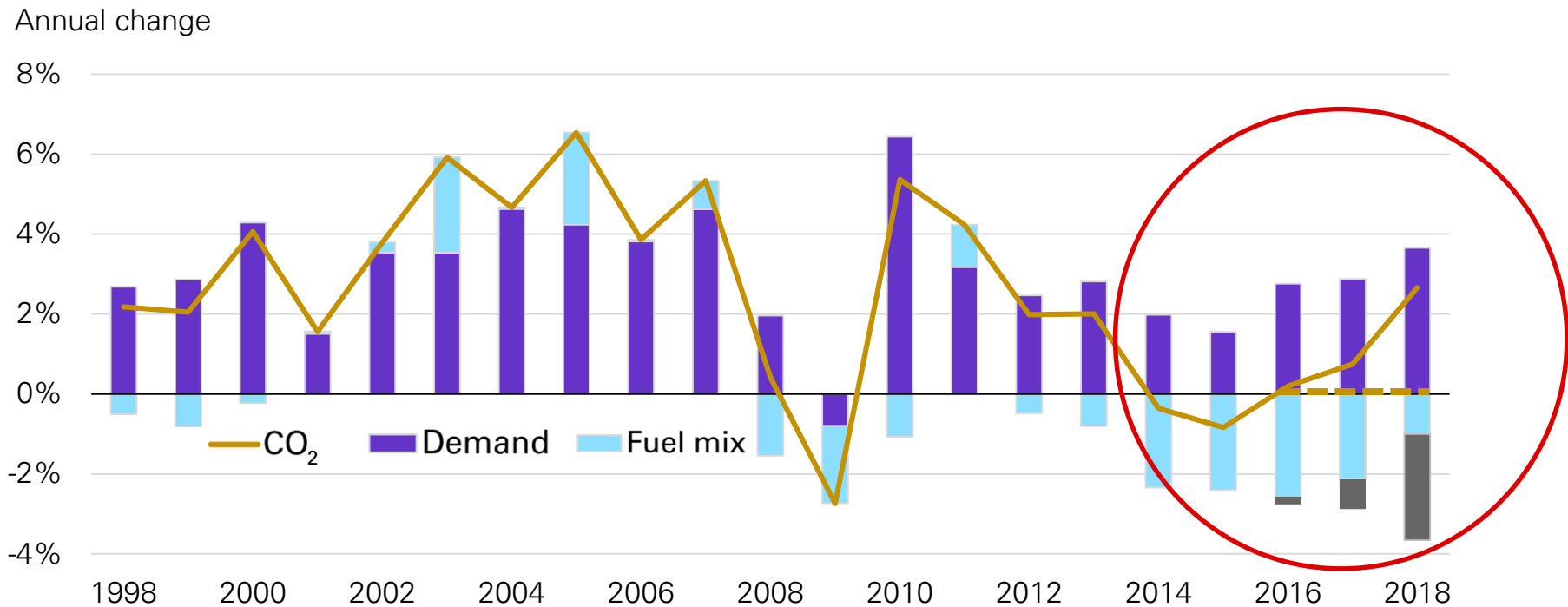
\*\* Adjusted for real exchange rate movements

Source: CDU of MoE, GKS, CBR, ECM calculations

# Power sector fuel mix



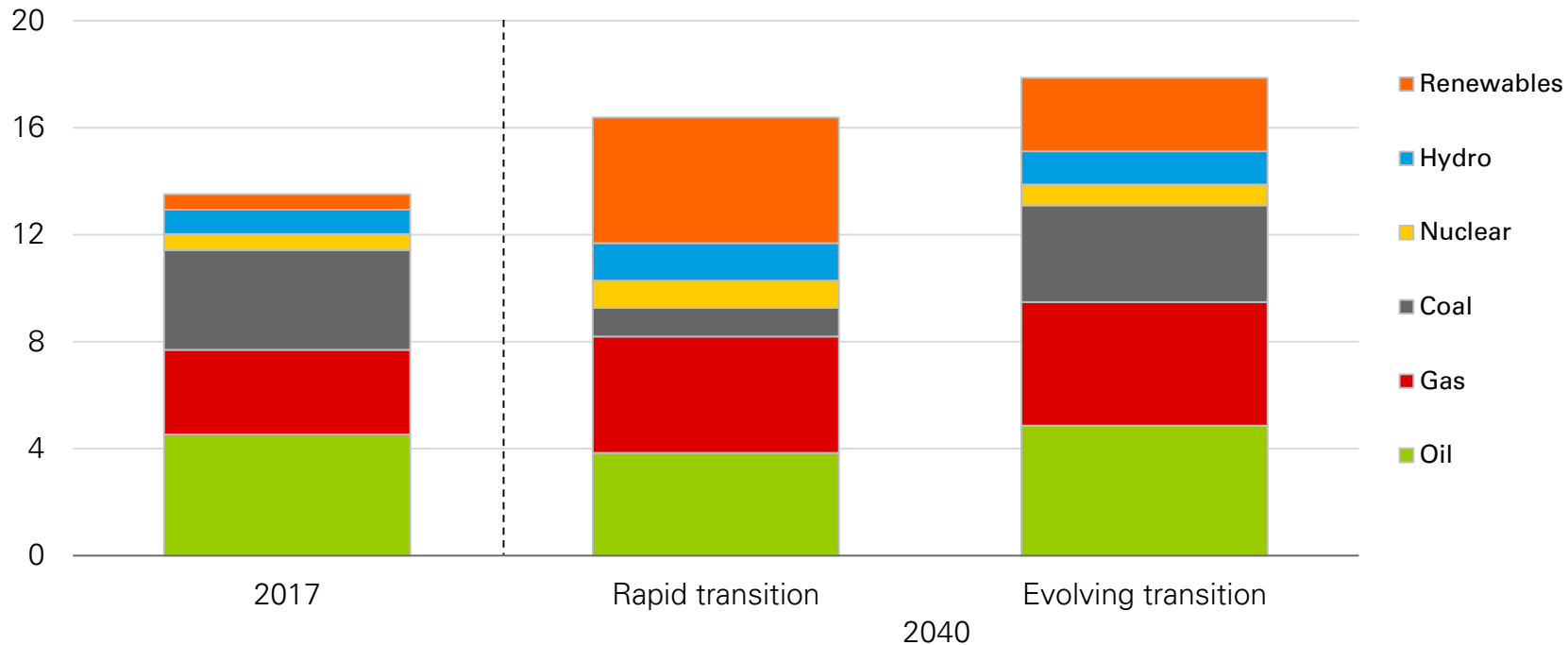
# Carbon emissions from global power sector



# Global energy demand and fuel mix

## Primary energy consumption by fuel

Billion toe

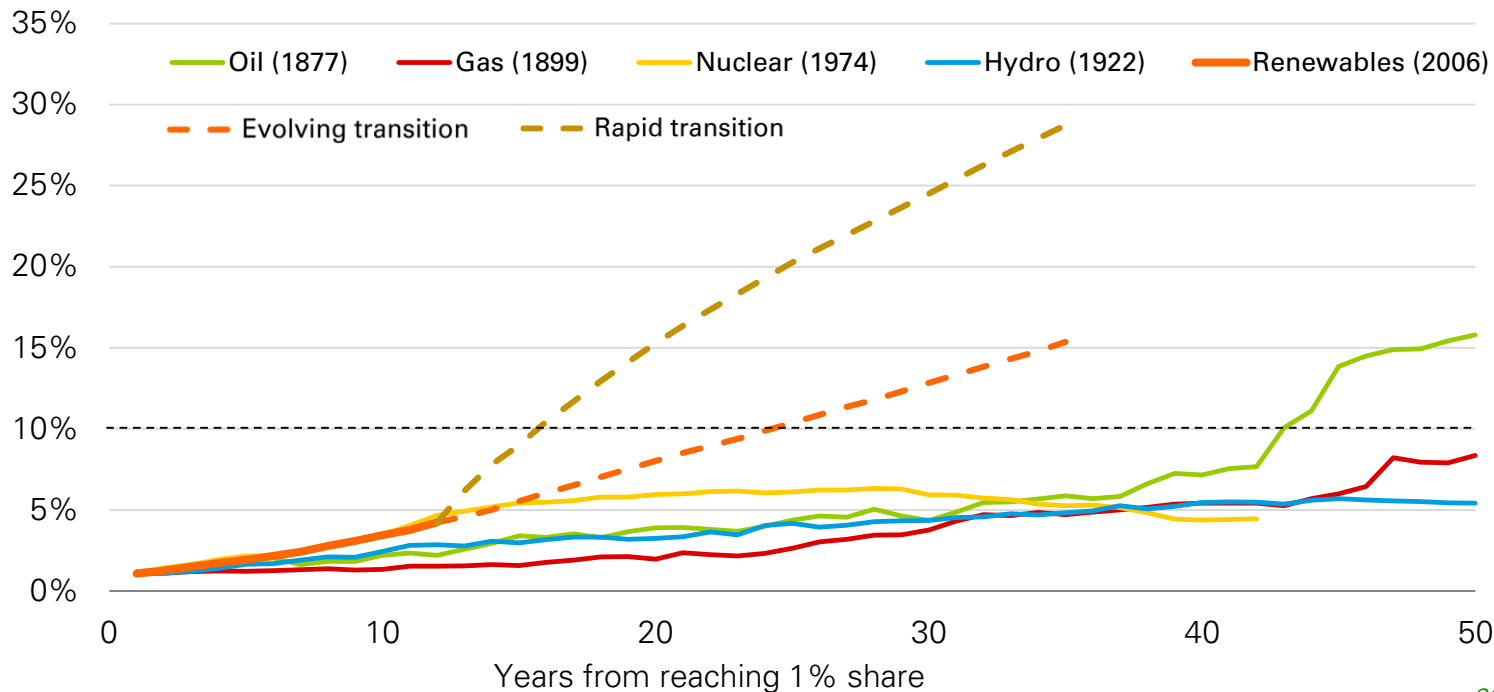


# Speed of energy transition



## Speed of penetration of new fuels in global energy system

Share of world energy

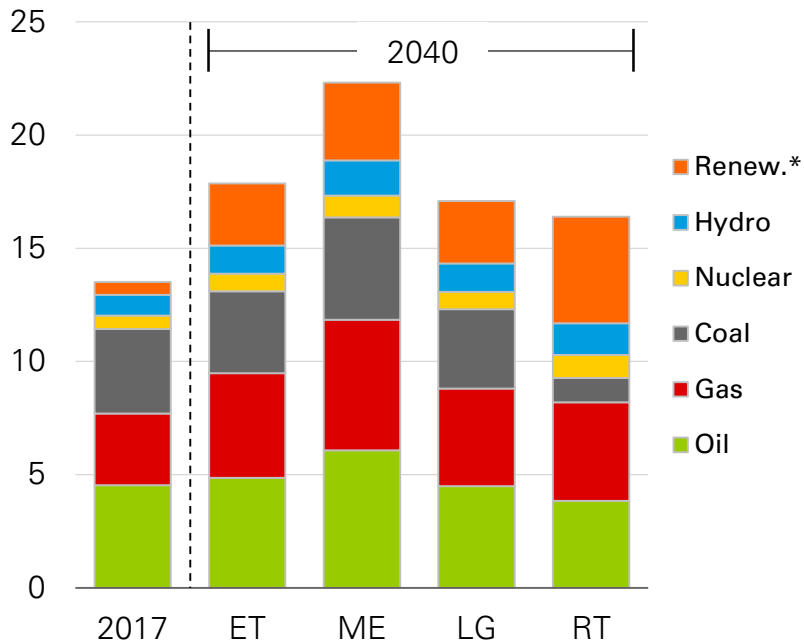




# Energy Outlook scenarios

## Primary energy consumption by fuel

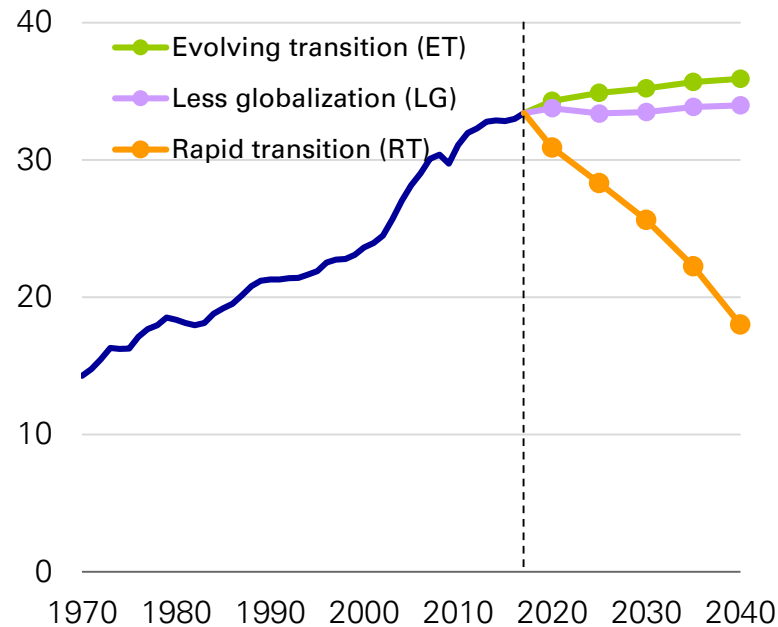
Billion toe



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

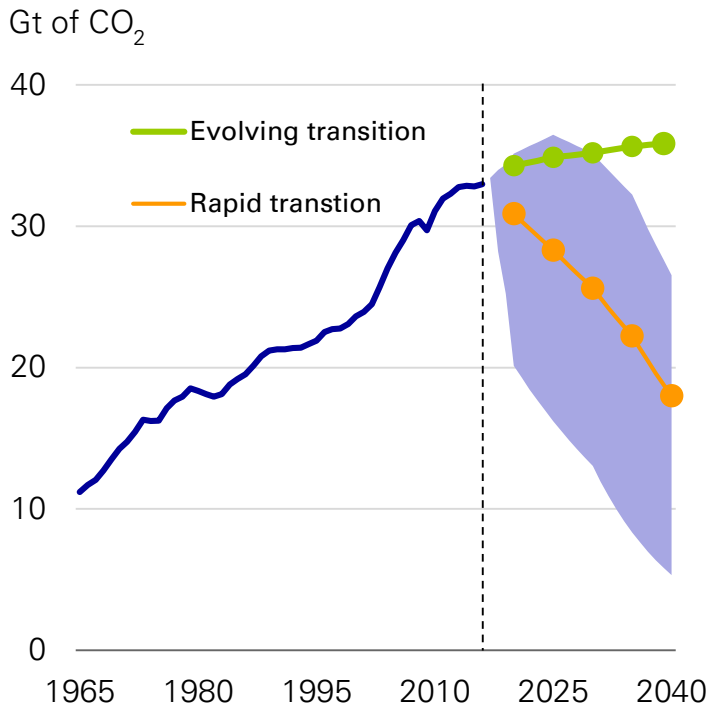
## CO<sub>2</sub> emissions

Gt of CO<sub>2</sub>



# CO<sub>2</sub> emissions

## CO<sub>2</sub> emissions



## CO<sub>2</sub> in 2040: ET vs RT scenario

