

# World Energy Outlook 2018

Tokyo, 11 January 2019

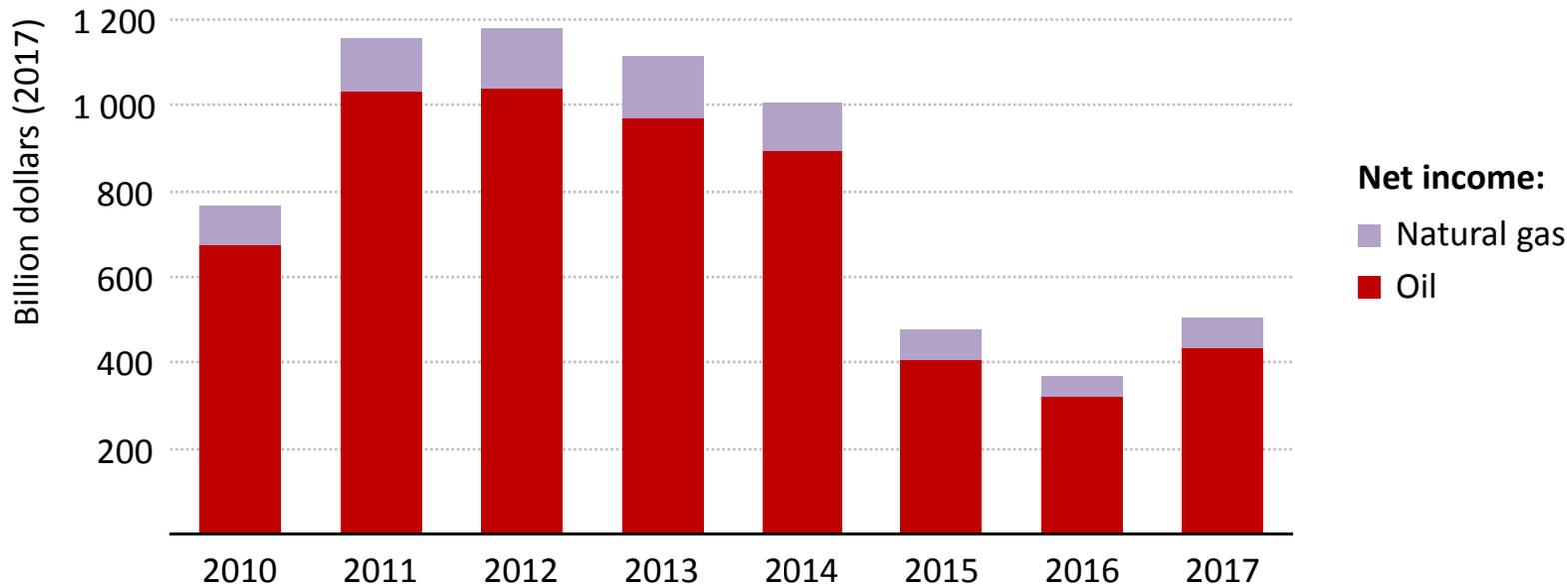
*Tim Gould*  
*Head of Division, World Energy Outlook*  
*International Energy Agency*

# Today's energy context

- Mixed signals about the pace & direction of change in global energy:
  - Oil markets are entering a period of **renewed uncertainty & volatility**

# A rollercoaster ride

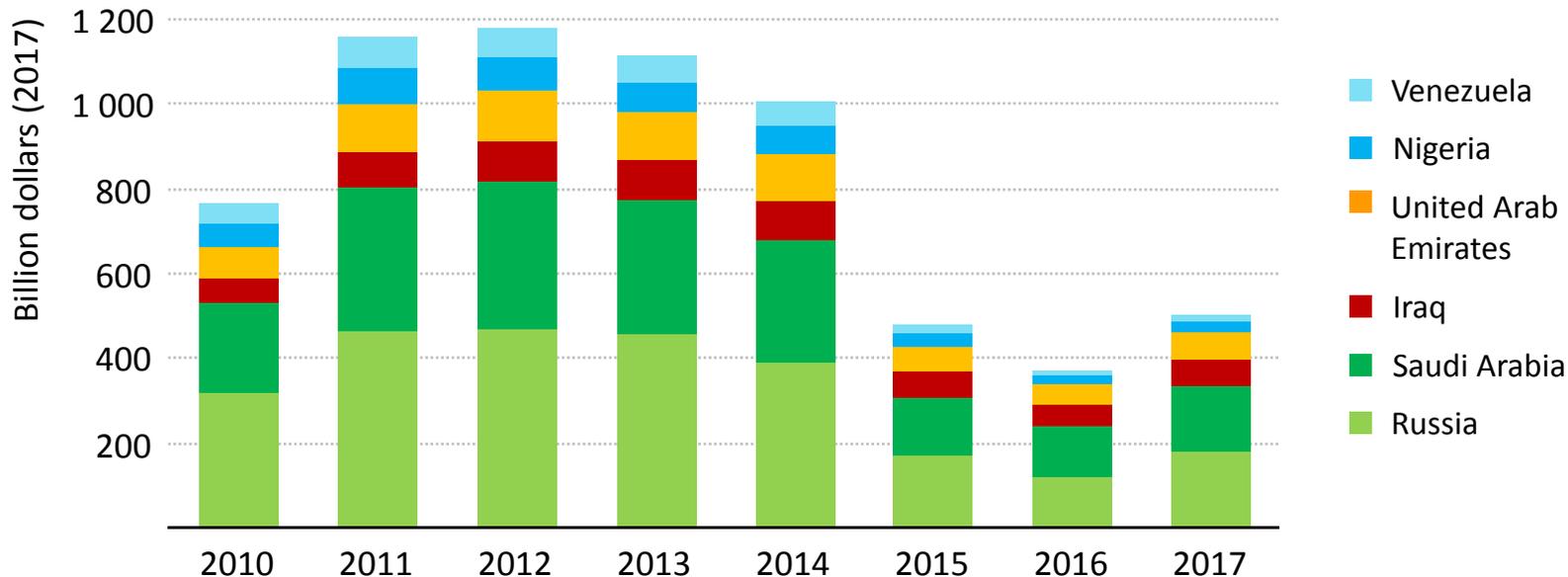
Net income from oil and gas in six selected producer economies



*The fall in oil prices that started in 2014 brought into sharp relief some risks associated with high dependence on hydrocarbon revenues*

# A rollercoaster ride

Net income from oil and gas in six selected producer economies

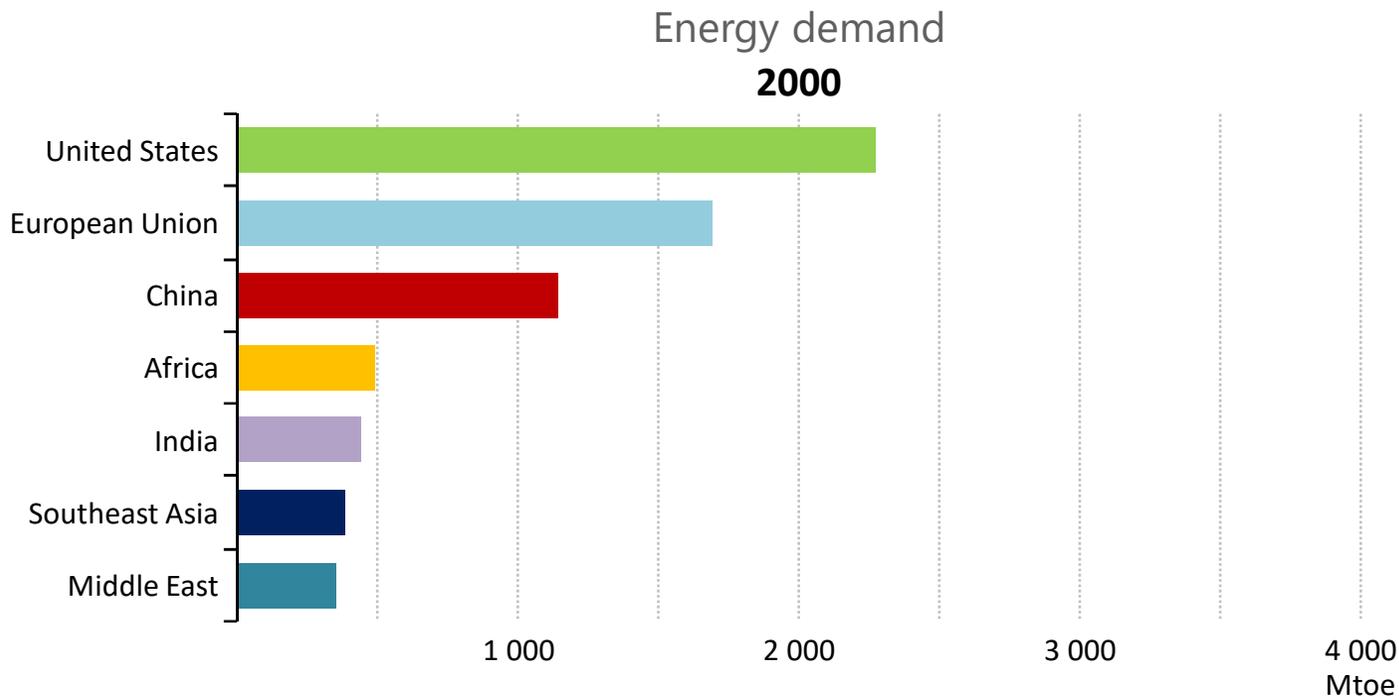


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# Today's energy context

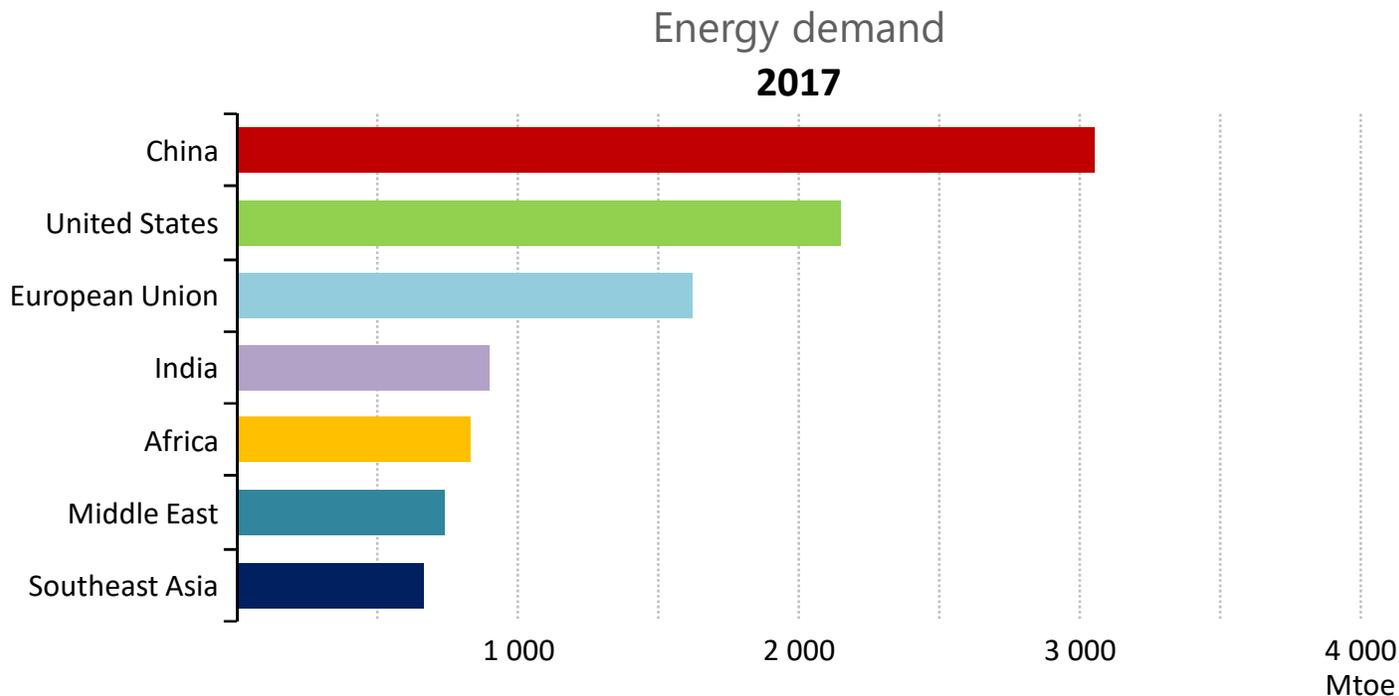
- Mixed signals about the pace & direction of change in global energy:
  - Oil markets are entering a period of **renewed uncertainty & volatility**
  - **Natural gas is on the rise**: China's rapid demand growth is erasing talk of a 'gas glut'
  - **Solar PV has the momentum** while other key technologies & efficiency policies need a push
  - Our assessment points to **energy-related CO<sub>2</sub> emissions reaching a historic high in 2018**
  - For the first time, the global **population without access to electricity fell below 1 billion**
- **Electricity** is carrying great expectations, but questions remain over the extent of its reach in meeting demand & how the power systems of the future will operate
- Policy makers need well-grounded insights about different possible futures & how they come about. The *WEO* provides two key scenarios:
  - New Policies Scenario
  - Sustainable Development Scenario

# The new geography of energy



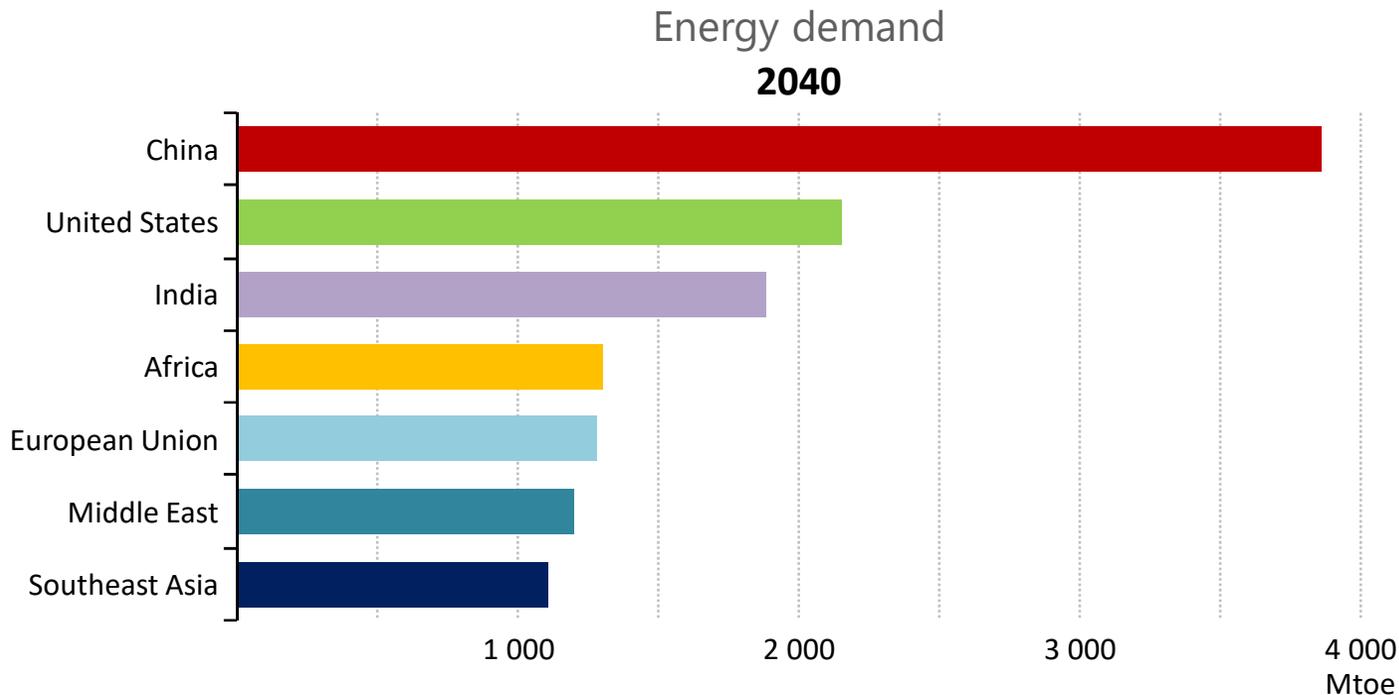
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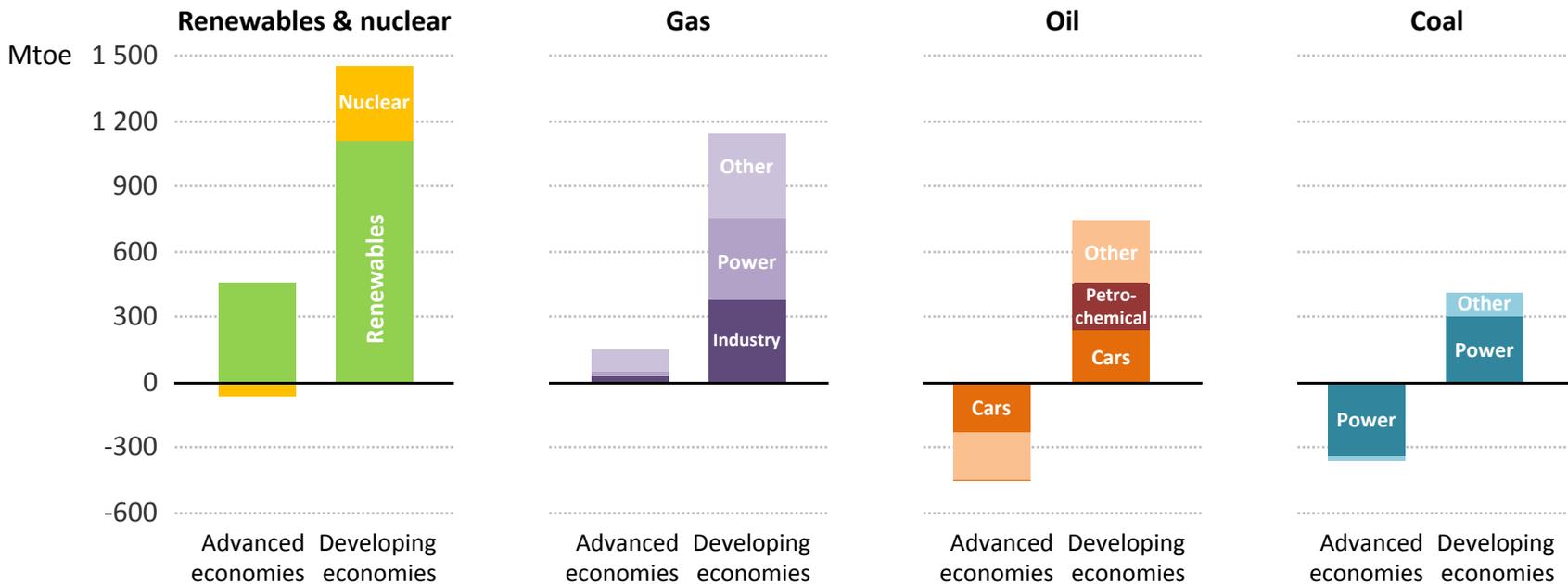
# The new geography of energy



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# Fuelling the demand for energy

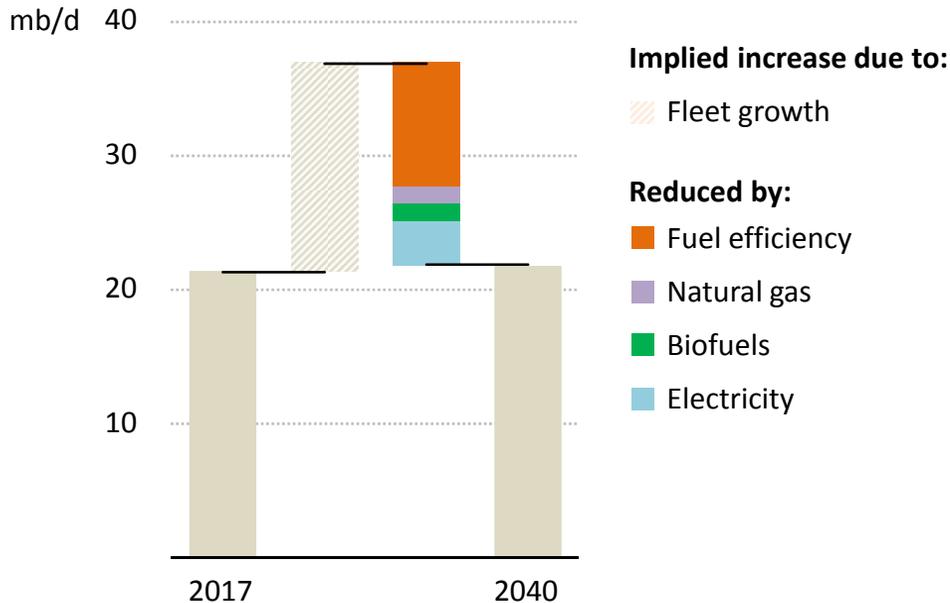
## Change in global energy demand, 2017-2040



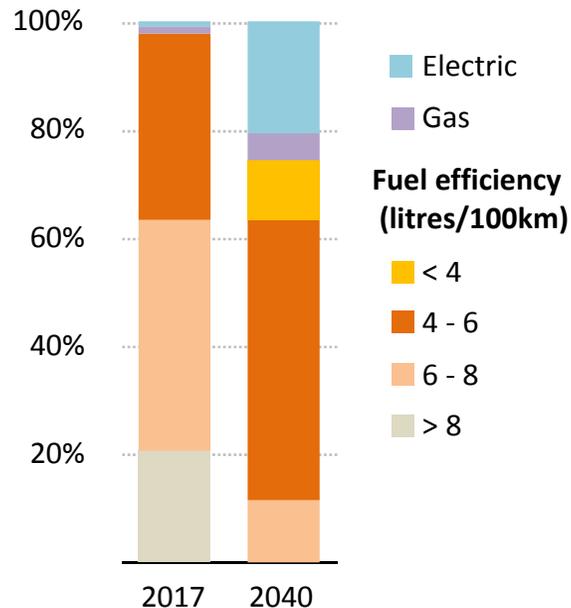
*The increase in demand would be twice as large without continued improvements in energy efficiency, a powerful tool to address energy security & sustainability concerns*

# Improved efficiency is the key to the outlook for cars

## Change in global oil demand for cars

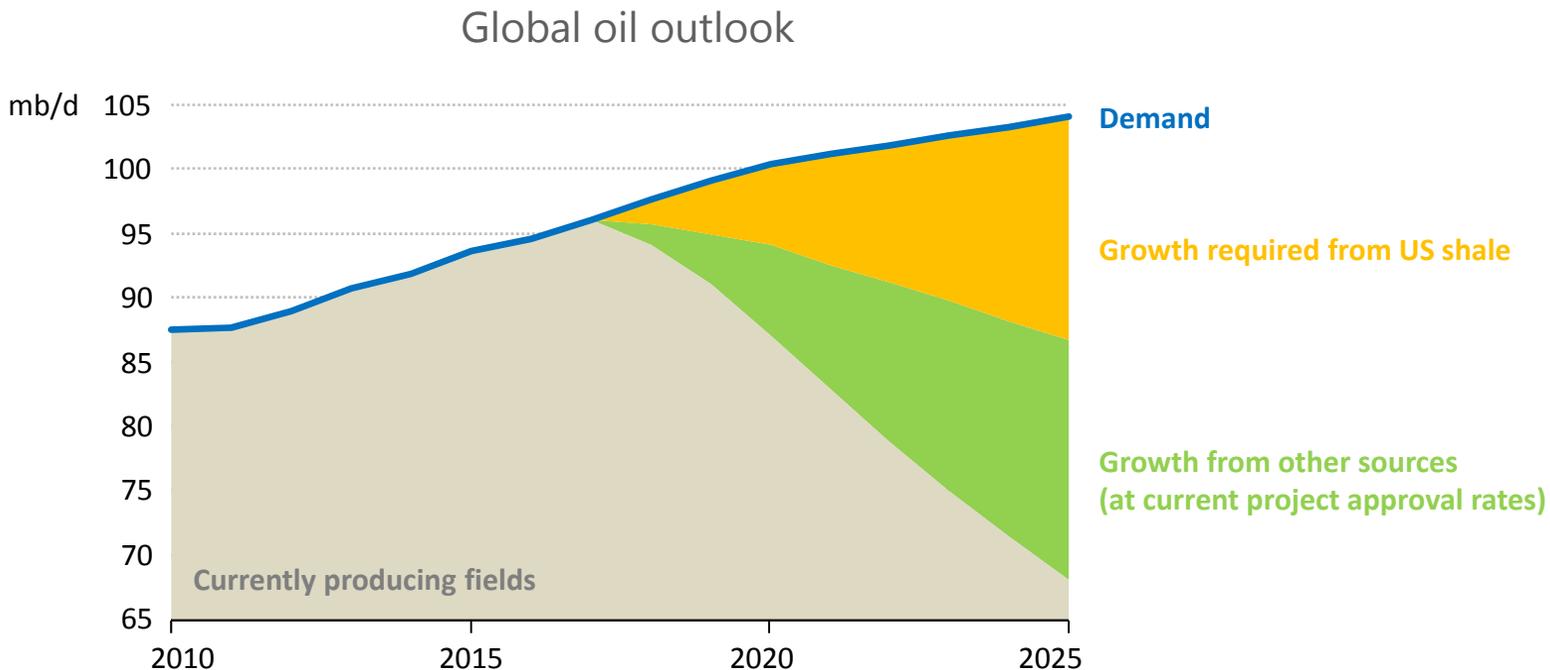


## Global car sales



*Energy efficiency is the key mechanism that curbs oil consumption in cars. By 2040 there are no cars sold that have an efficiency worse than 6.5 litres/100 km.*

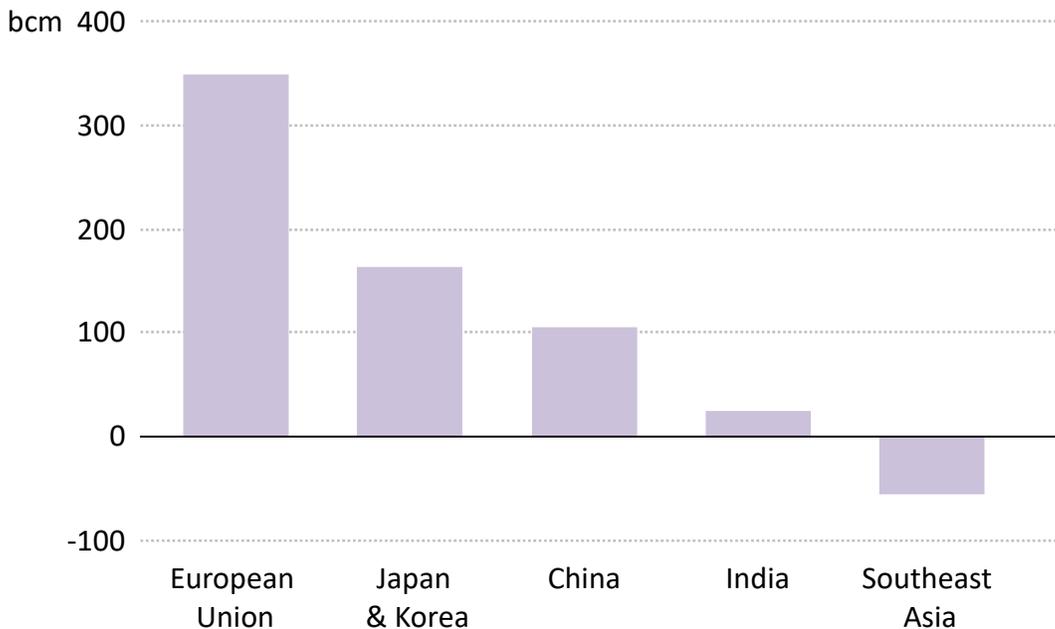
# Can US shale alone avoid a turbulent oil market?



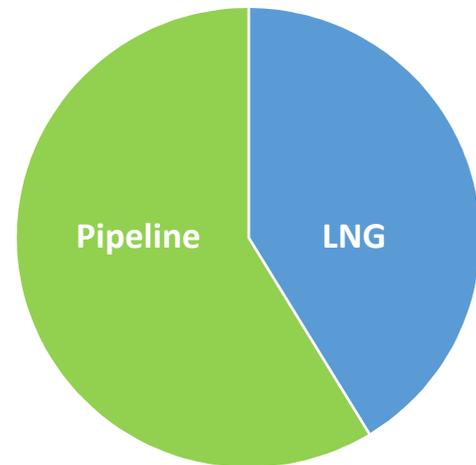
*Oil demand looks robust in the near term; if approvals of new conventional projects remain low, market stability would require continuous exceptional growth in US shale*

# China – the emerging giant of gas demand

## Net gas imports in 2017



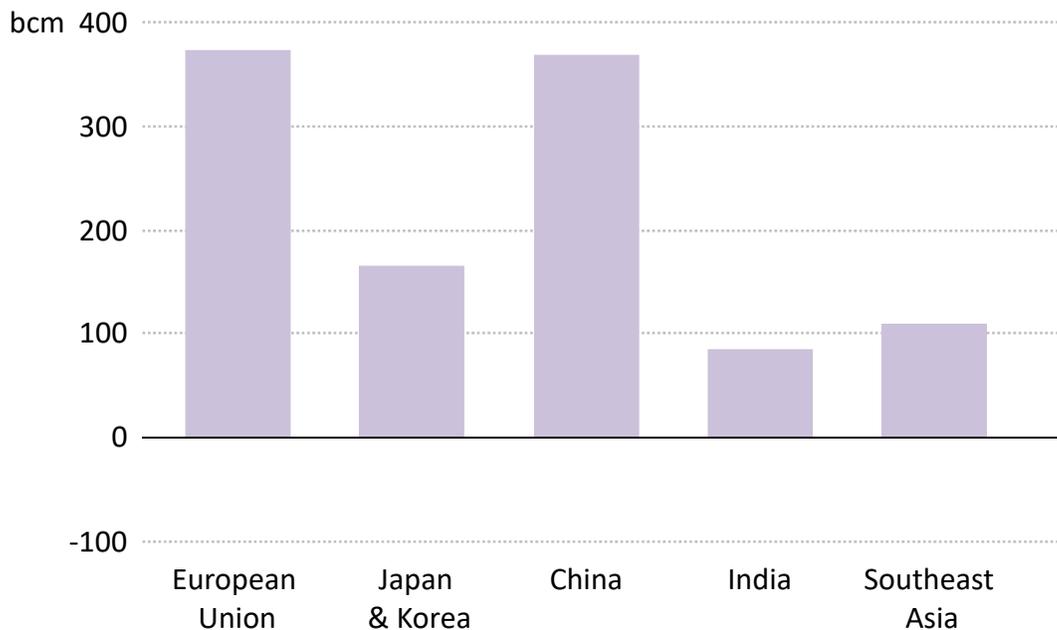
## Shares in long-distance gas trade, 2017



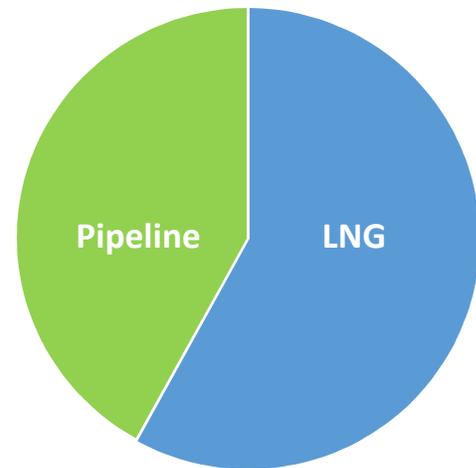
*Developing countries in Asia – led by China – dominate the rise in long-distance gas trade; more than 80% of the growth to 2040 comes in the form of LNG*

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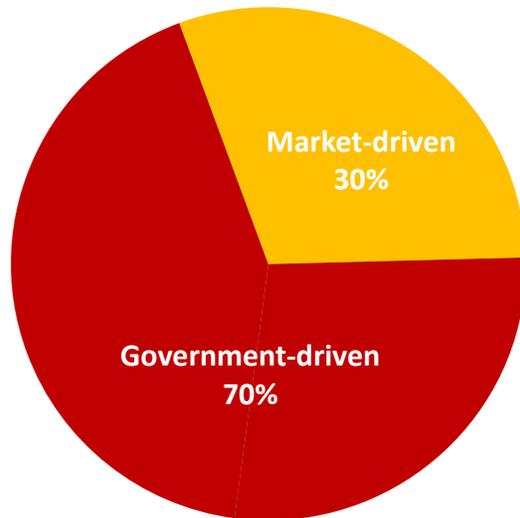
## Shares in long-distance gas trade, 2040



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# Our energy destiny rests with governments

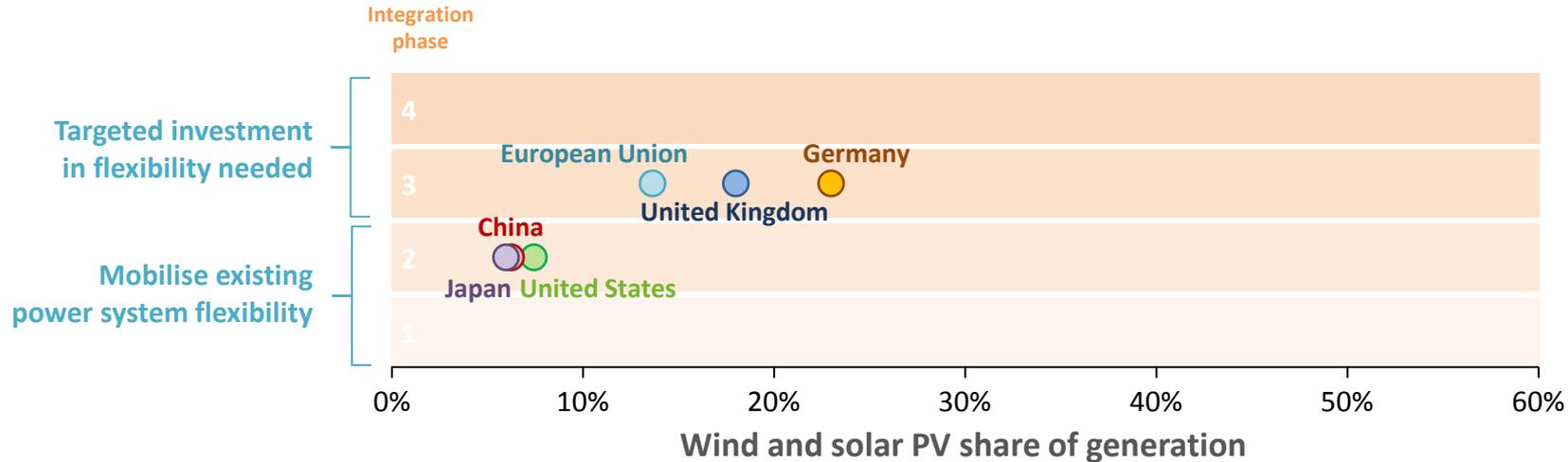
Total investment in energy supply to 2040:  
**\$42.3 trillion**



*More than 70% of the \$2 trillion required each year in energy supply investment either comes from state-directed entities or receives a full or partial revenue guarantee*

# Flexibility: the cornerstone of tomorrow's power systems

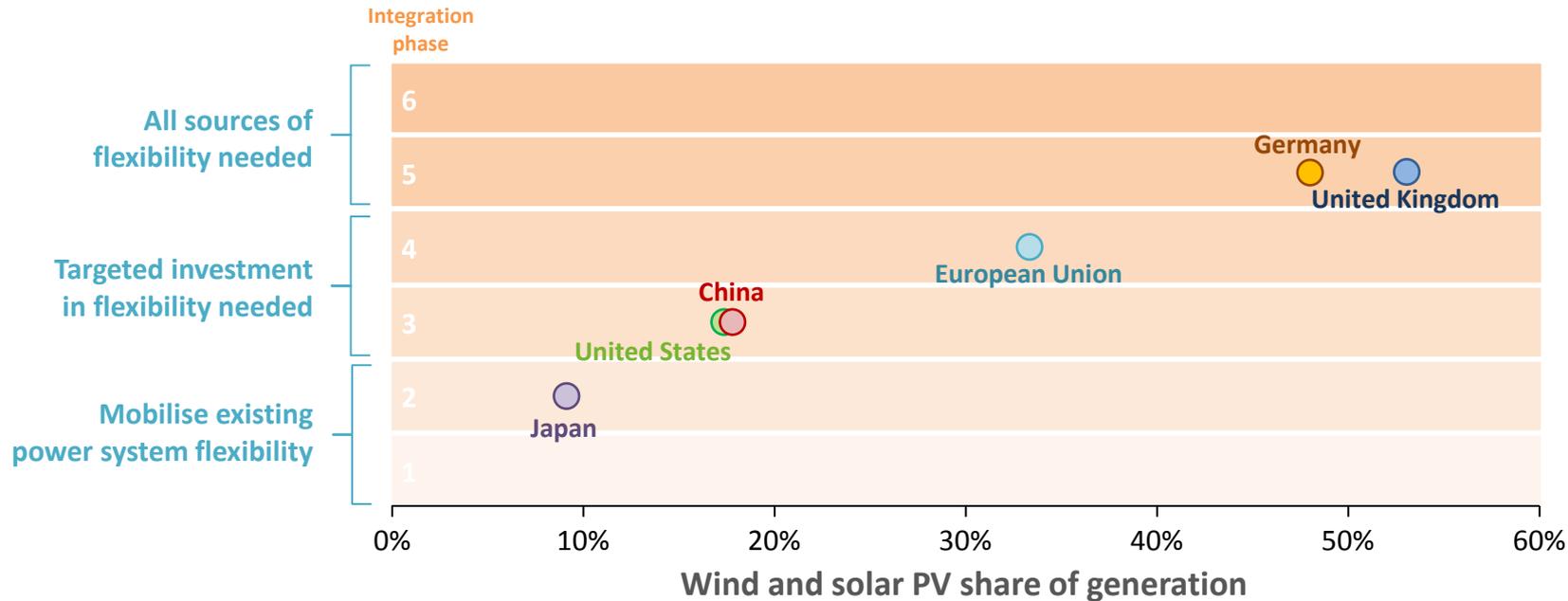
Phases of integration with variable renewables share, 2017



*Higher shares of variable renewables raise flexibility needs and call for reforms to deliver investment in power plants, grids & energy storage, and unlock demand-side response*

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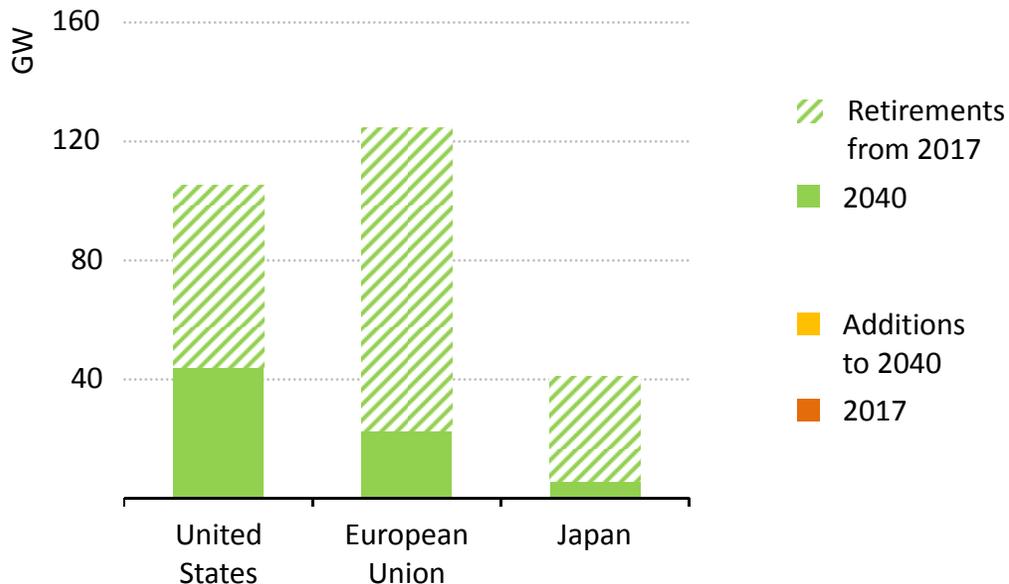
Phases of integration with variable renewables share, 2030



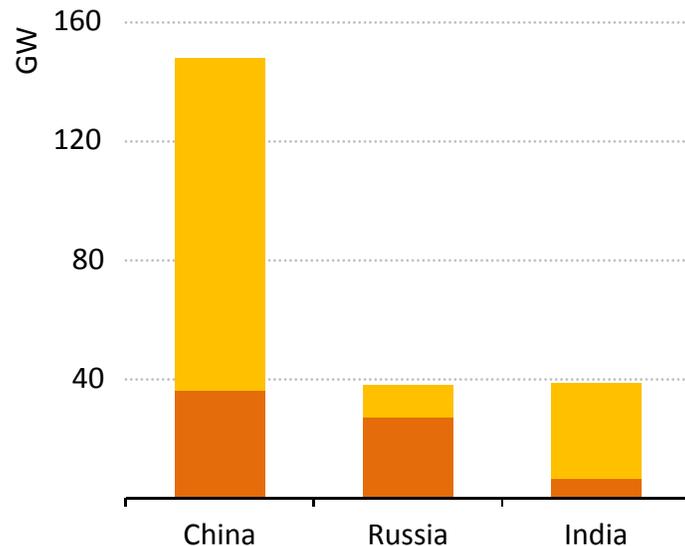
*Higher shares of variable renewables raise flexibility needs and call for reforms to deliver investment in power plants, grids & energy storage, and unlock demand-side response*

# Two directions for nuclear power

## Without policy changes

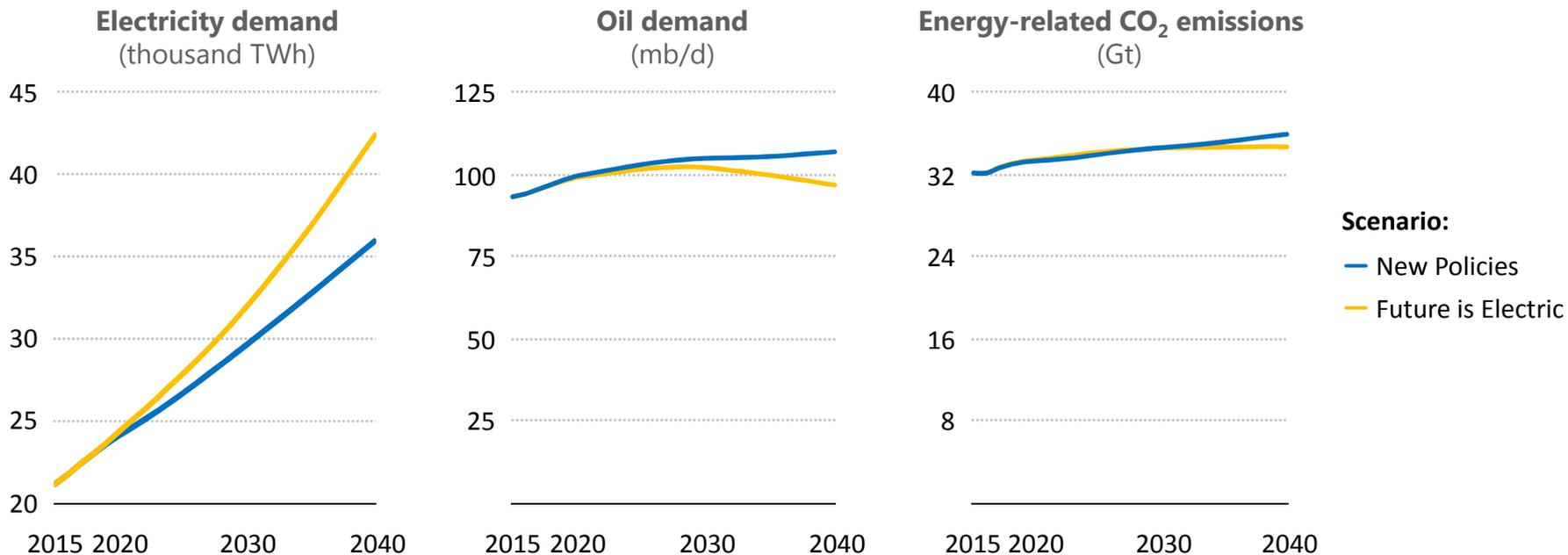


## Growth markets



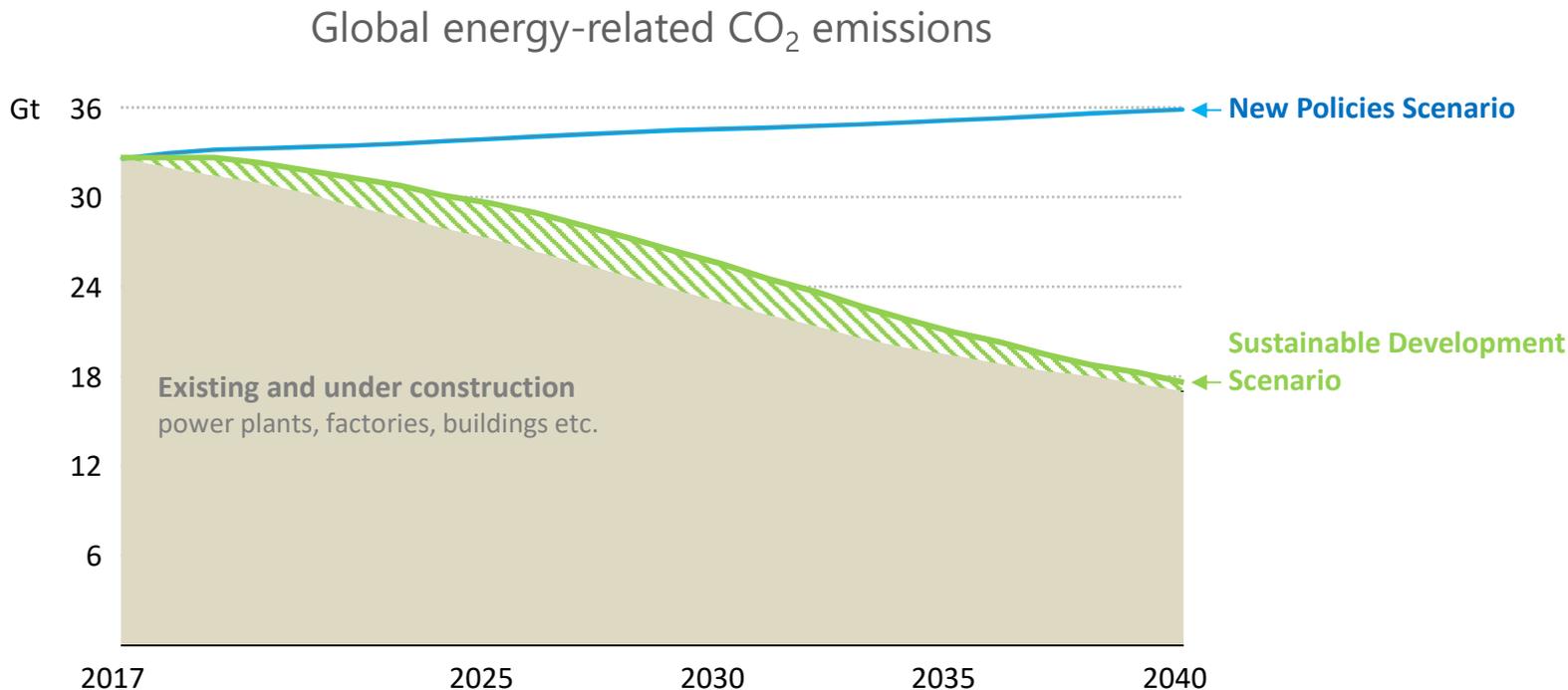
*The contribution of nuclear power could decline substantially in leading markets, while large growth is coming, as China takes first position within a decade*

# What if the future is electric?



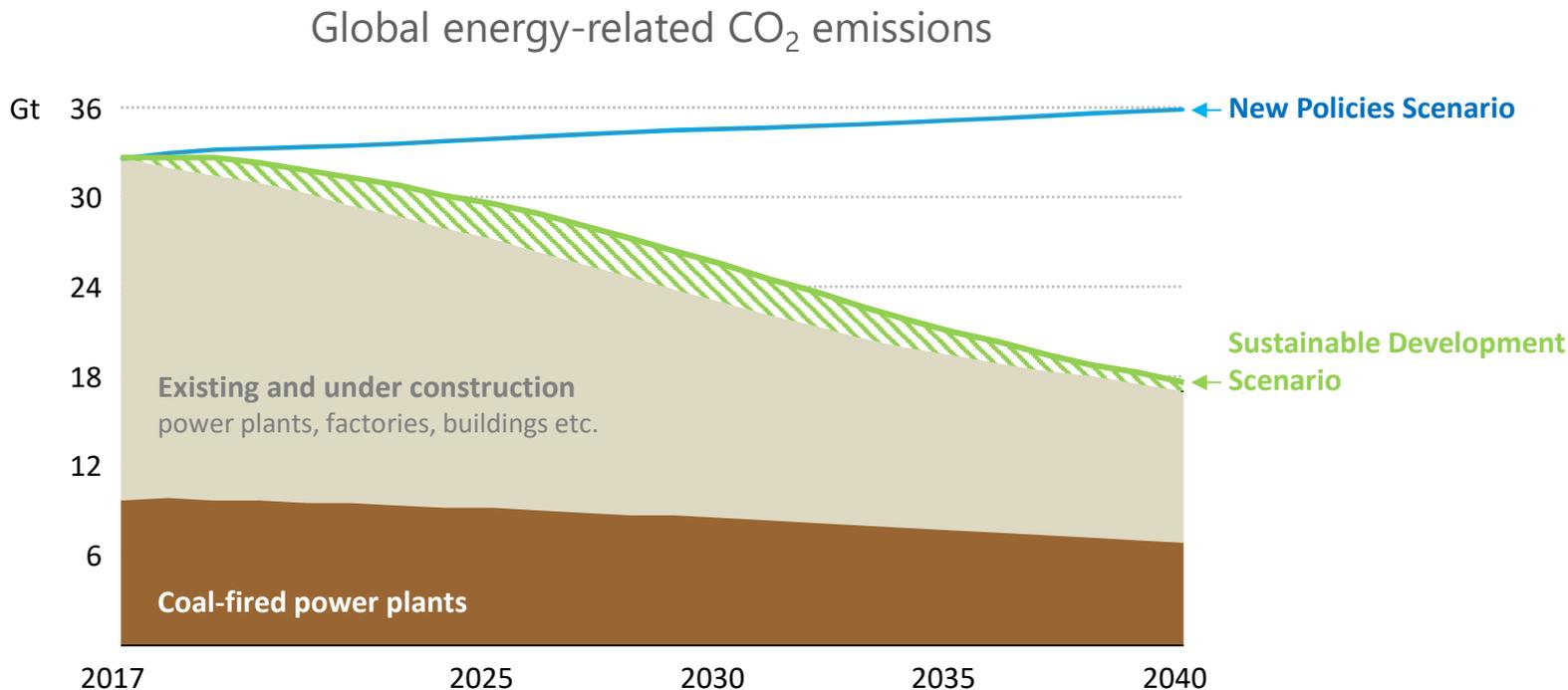
*Increased electrification leads to a peak in oil demand, avoids 2 million air pollution-related premature deaths, but does not necessarily lead to large CO<sub>2</sub> emissions reductions*

# Can we unlock a different energy future?



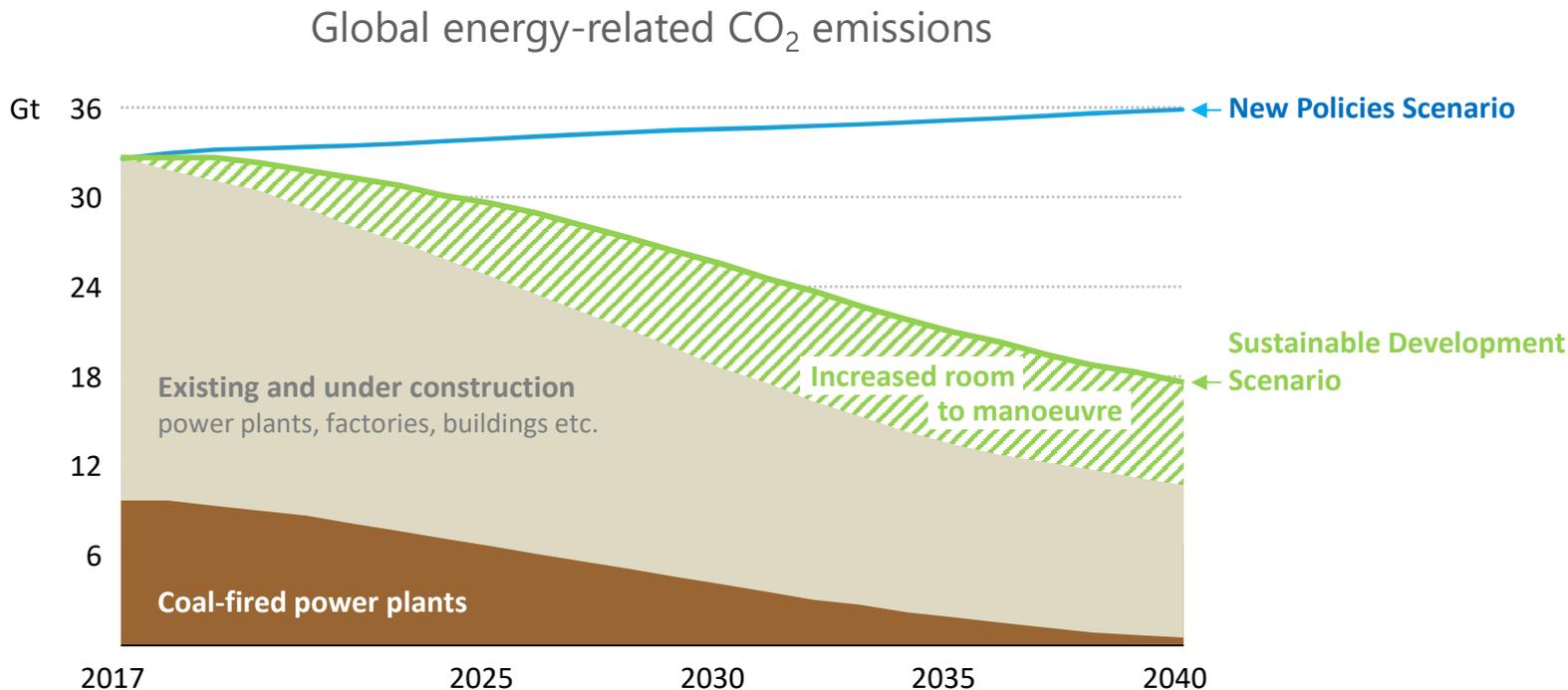
*Coal plants make up one-third of CO<sub>2</sub> emissions today and half are less than 15 years old; policies are needed to support CCUS, efficient operations and technology innovation*

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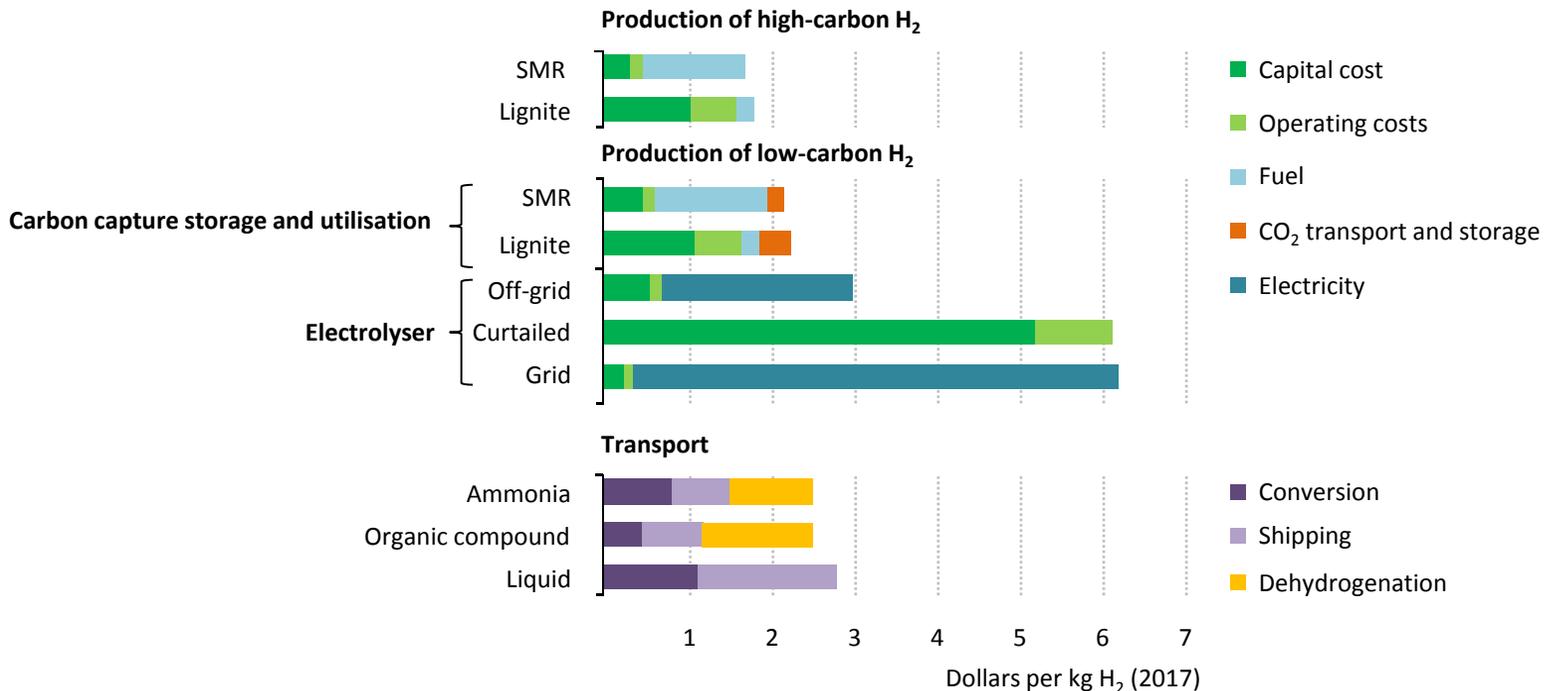
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# Is hydrogen heading back to the future?

Costs for hydrogen production in Australia and transportation to Japan in 2040



*There are multiple options for the production, transportation and consumption of zero-carbon hydrogen and hydrogen-based fuels*

# Conclusions

- The links between energy & geopolitics are strengthening & becoming more complex, a major factor in the outlook for energy security
- A mismatch between robust oil demand in the near term & a shortfall in new projects risks a sharp tightening of oil markets in the 2020s
- The rapid growth of electricity brings huge opportunities; but market designs need to deliver both electricity *and* flexibility to keep the lights on
- There is no single solution to turn emissions around: renewables, efficiency & a host of innovative technologies, including storage, CCUS & hydrogen, are all required
- The future pathway for energy is open: governments will determine where our energy destiny lies

# World Energy Outlook 2018



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