

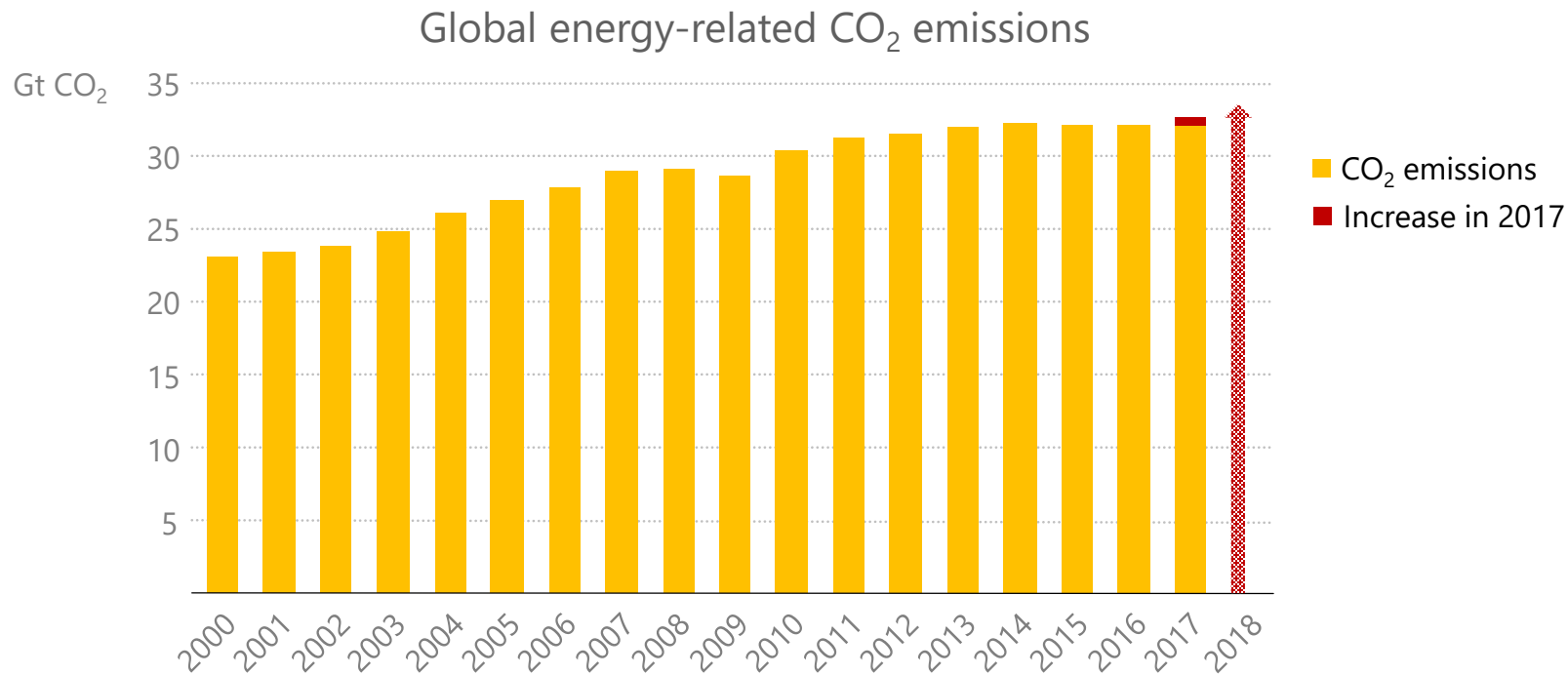
# World Energy Outlook 2018



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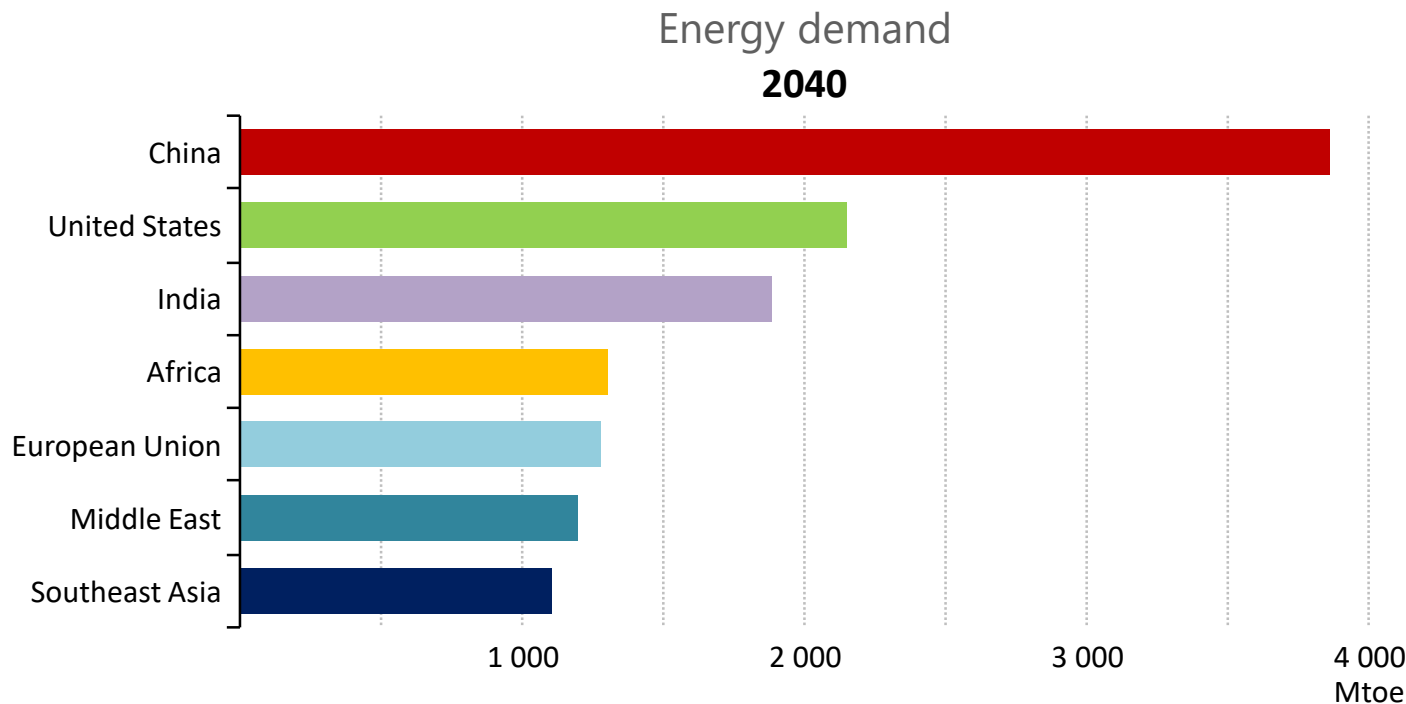
- Mixed signals about the pace & direction of change in global energy:
  - Oil markets are entering a period of **renewed uncertainty & volatility**
  - **Natural gas is on the rise**: China's rapid demand growth is erasing talk of a 'gas glut'
  - **Solar PV has the momentum** while other key technologies & efficiency policies need a push
  - **Growing disconnect** between climate goals and energy-market trends
  - 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.

# Global emissions are on the rise again



*Global CO<sub>2</sub> emissions are on the rise in 2018; Even in advanced economies – where they had been flat for 5 years – emissions are set to increase in 2018*

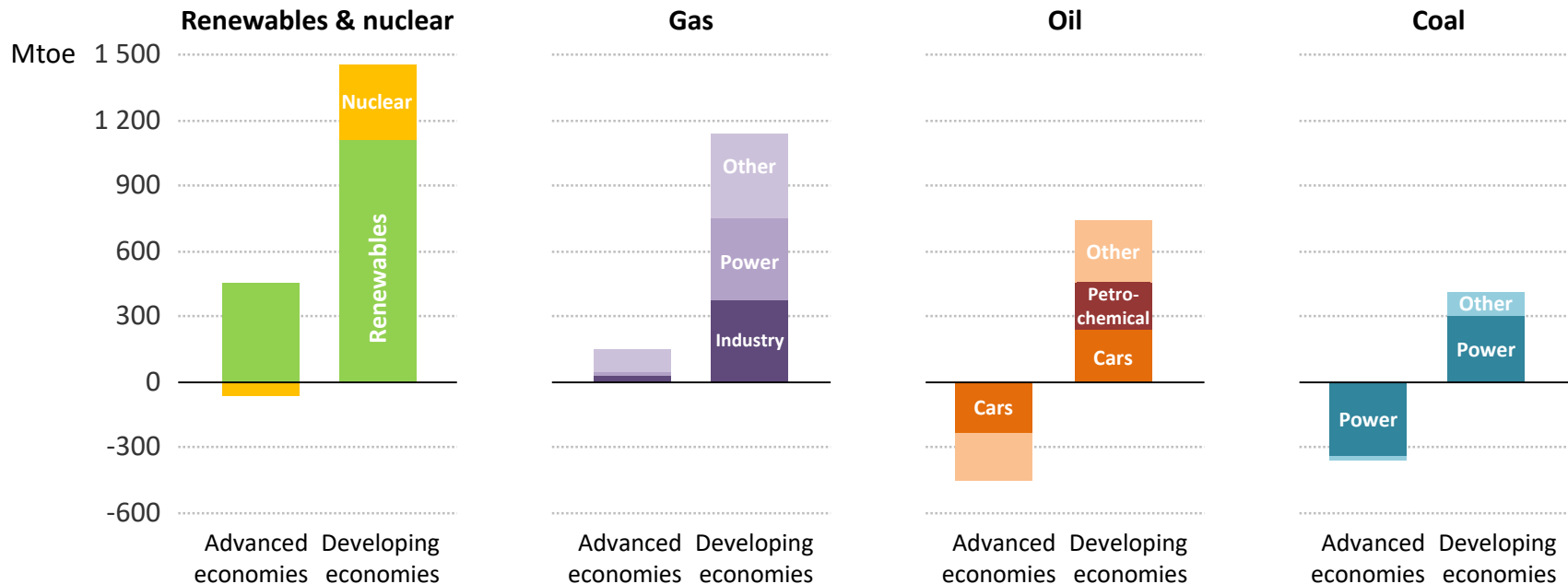
# The new geography of energy



*In 2000, more than 40% of global demand was in Europe & North America and some 20% in developing economies in Asia. By 2040, this situation is completely reversed.*

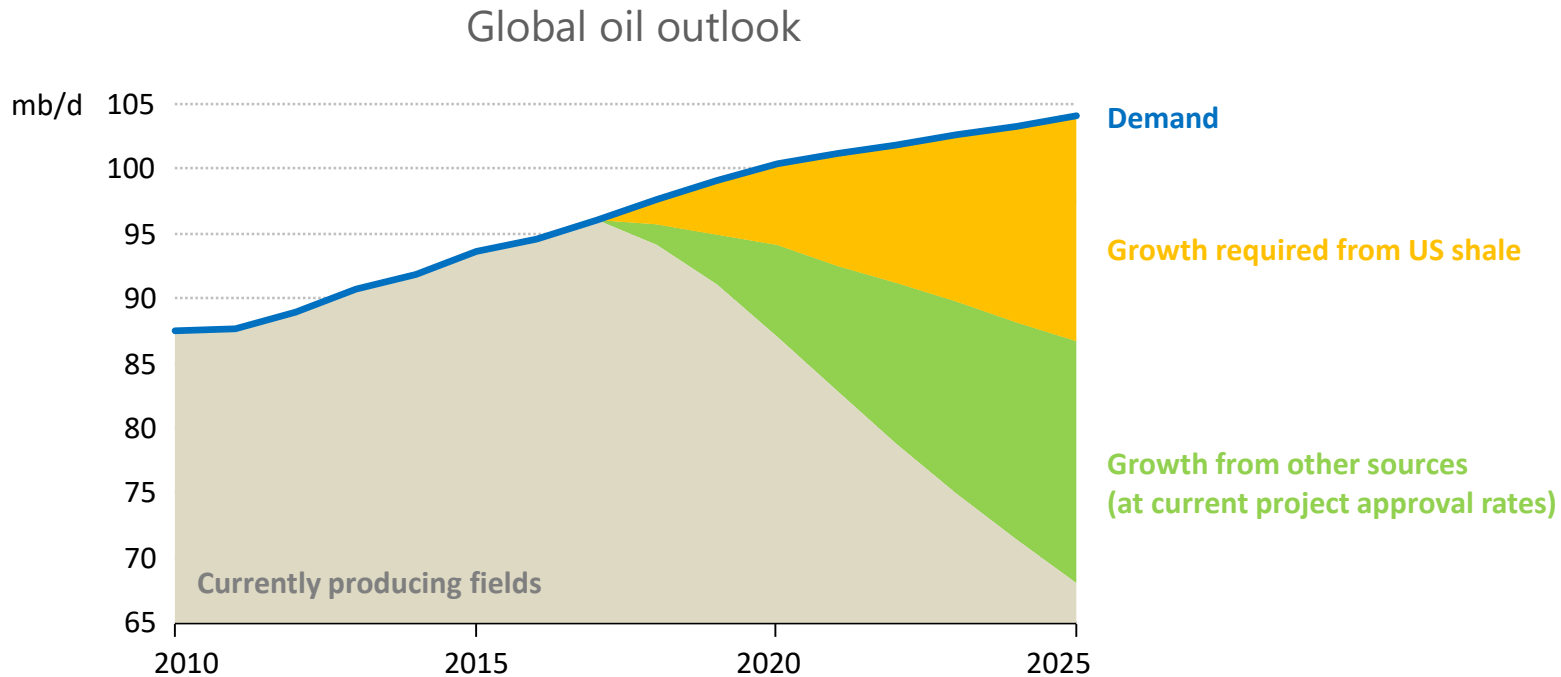
# Fuelling the demand for energy

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*

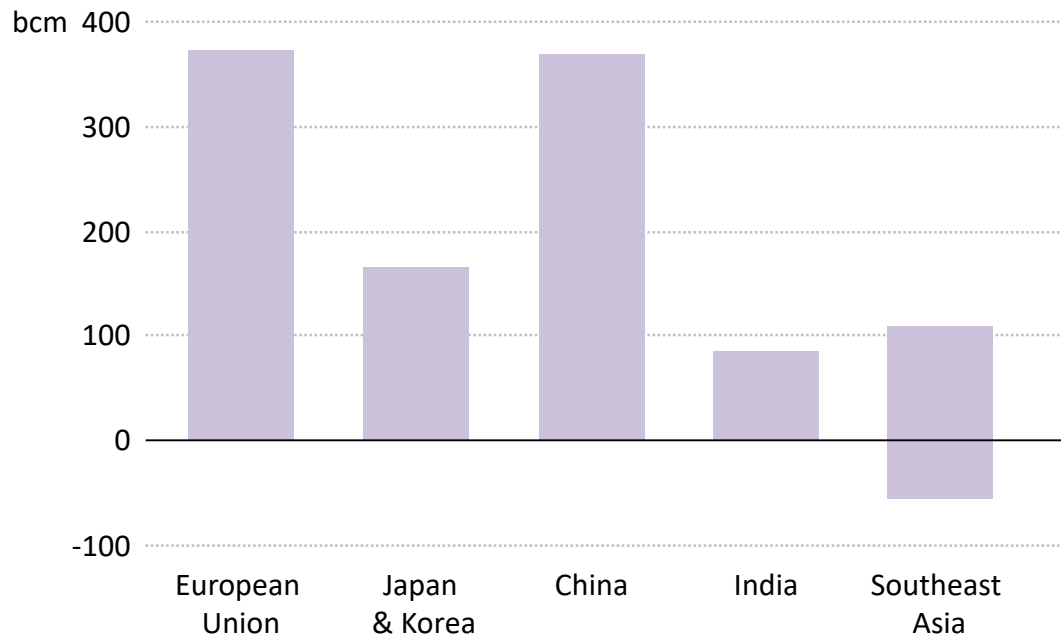
# Can US shale alone avoid a turbulent oil market?



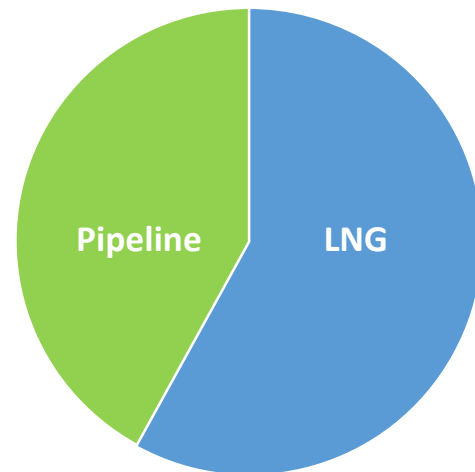
*Oil demand looks robust in the near term; if approvals of new conventional projects remain low, market stability would require continuous exceptional growth in US shale*

# China – the emerging giant of gas demand

Net gas imports in 2040



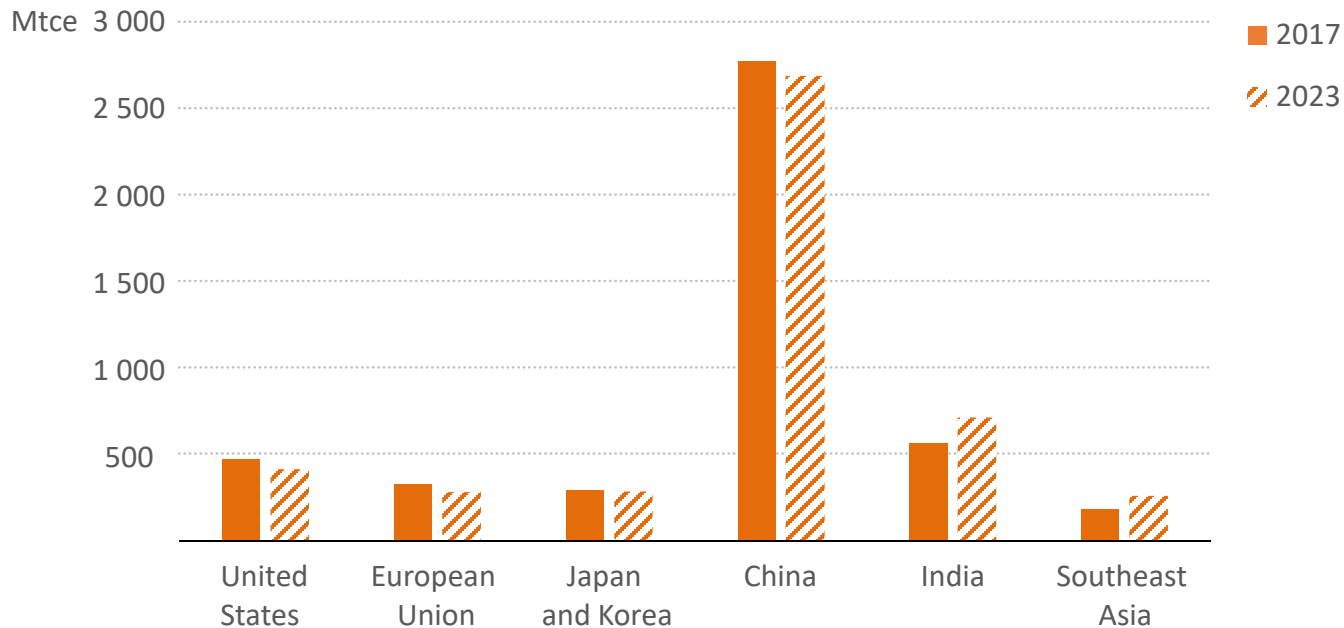
Shares in long-distance gas trade, 2040



*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*

# One planet, two coal worlds

Coal demand in select countries, 2017 and 2023

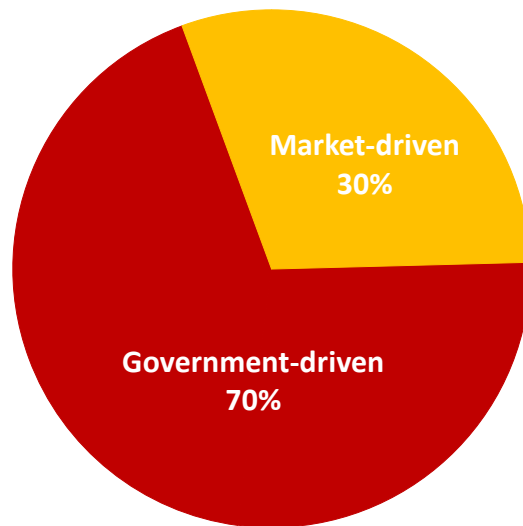


*India and southeast Asia will lead coal demand growth while it will continue to decline in Europe and United States*



# Our energy destiny rests with governments

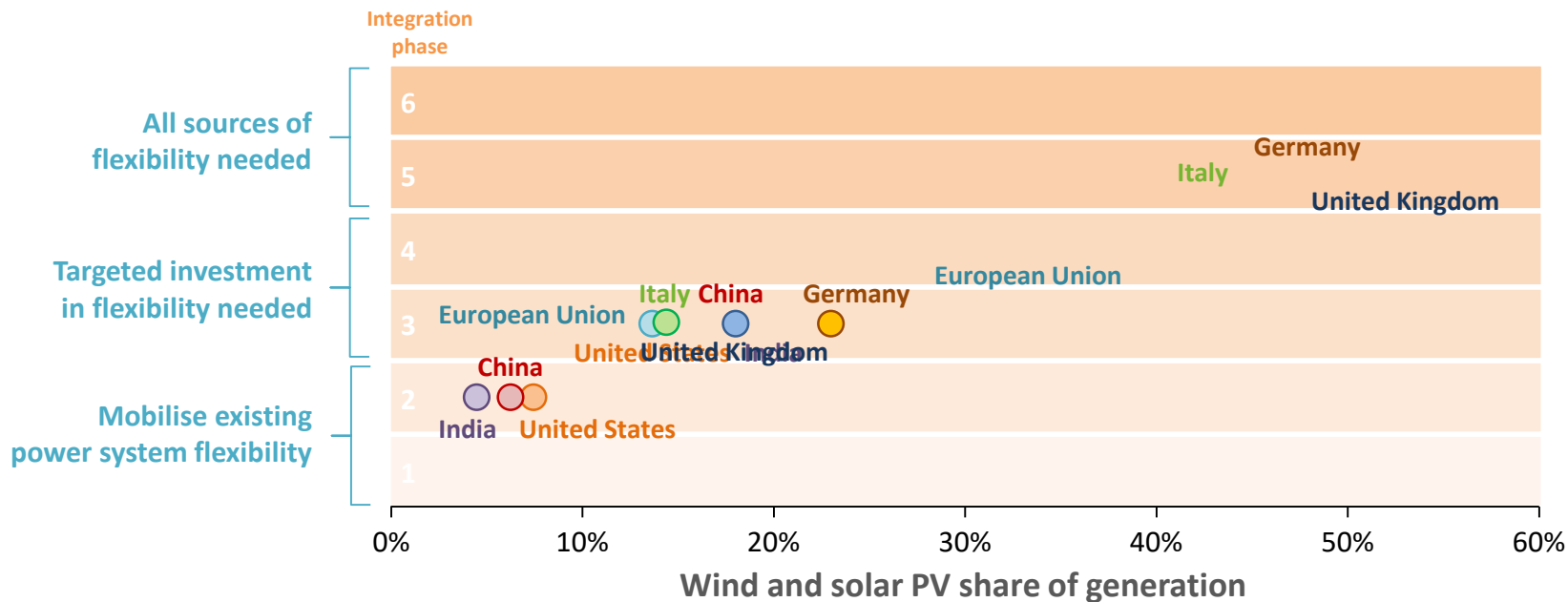
Total investment in energy supply to 2040:  
**\$42.3 trillion**



*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

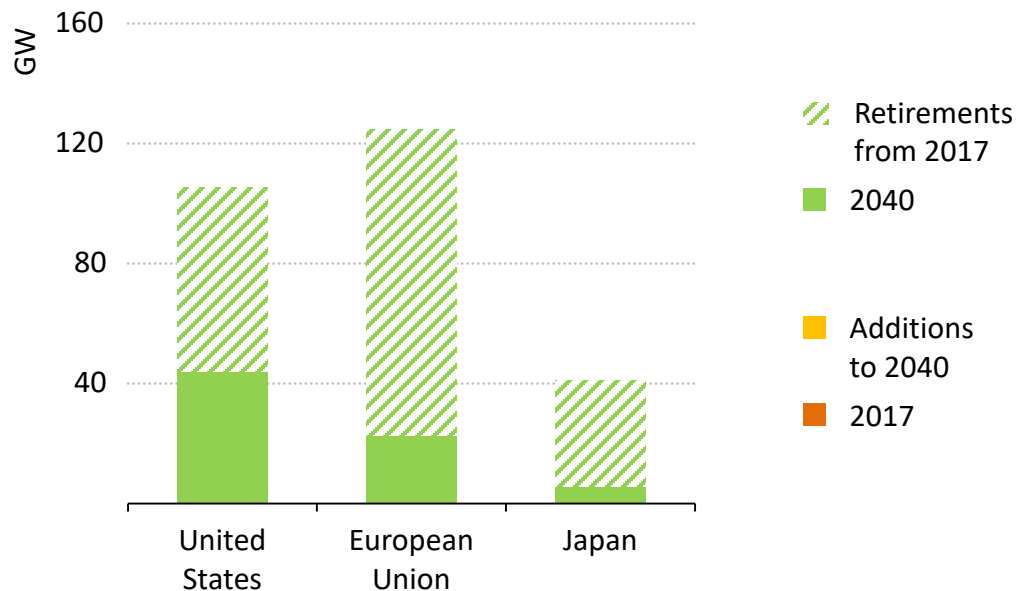
Phases of integration with variable renewables share, 2030



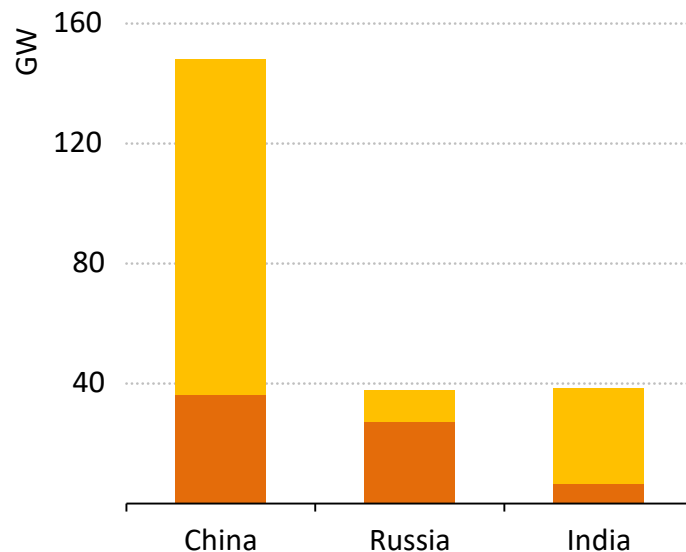
*Higher shares of variable renewables raise flexibility needs and call for reforms to deliver investment in power plants, grids & energy storage, and unlock demand-side response*

# Two directions for nuclear power

## Without policy changes

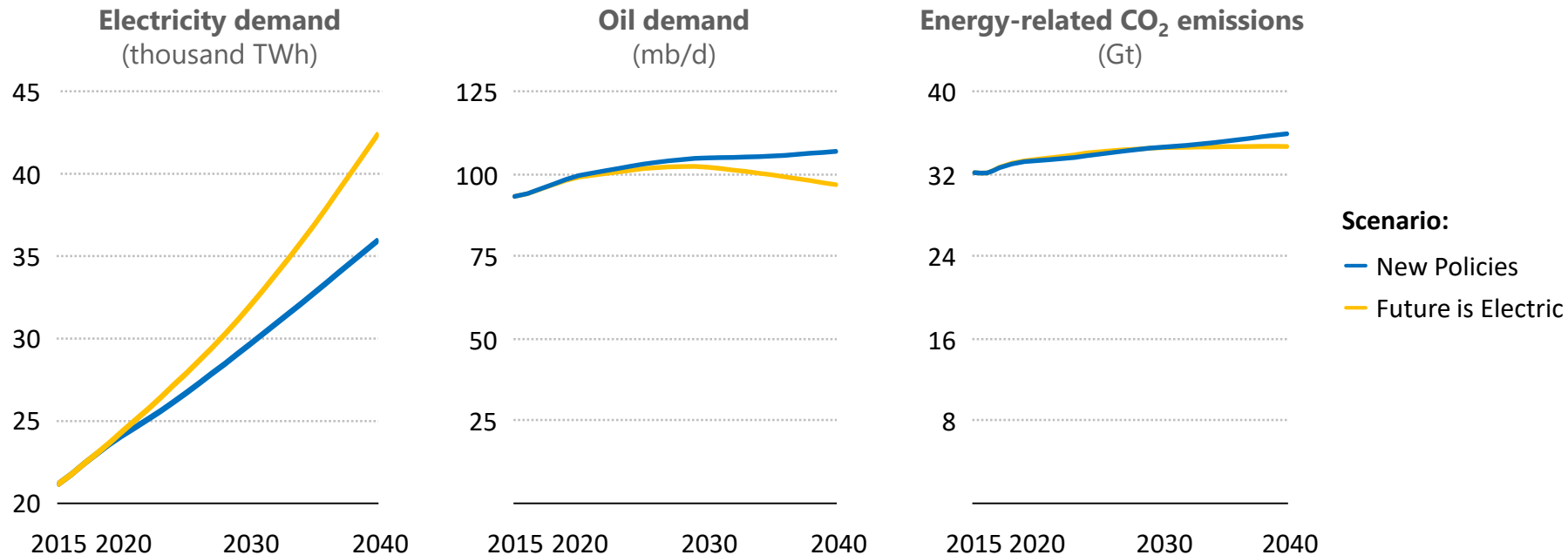


## Growth markets



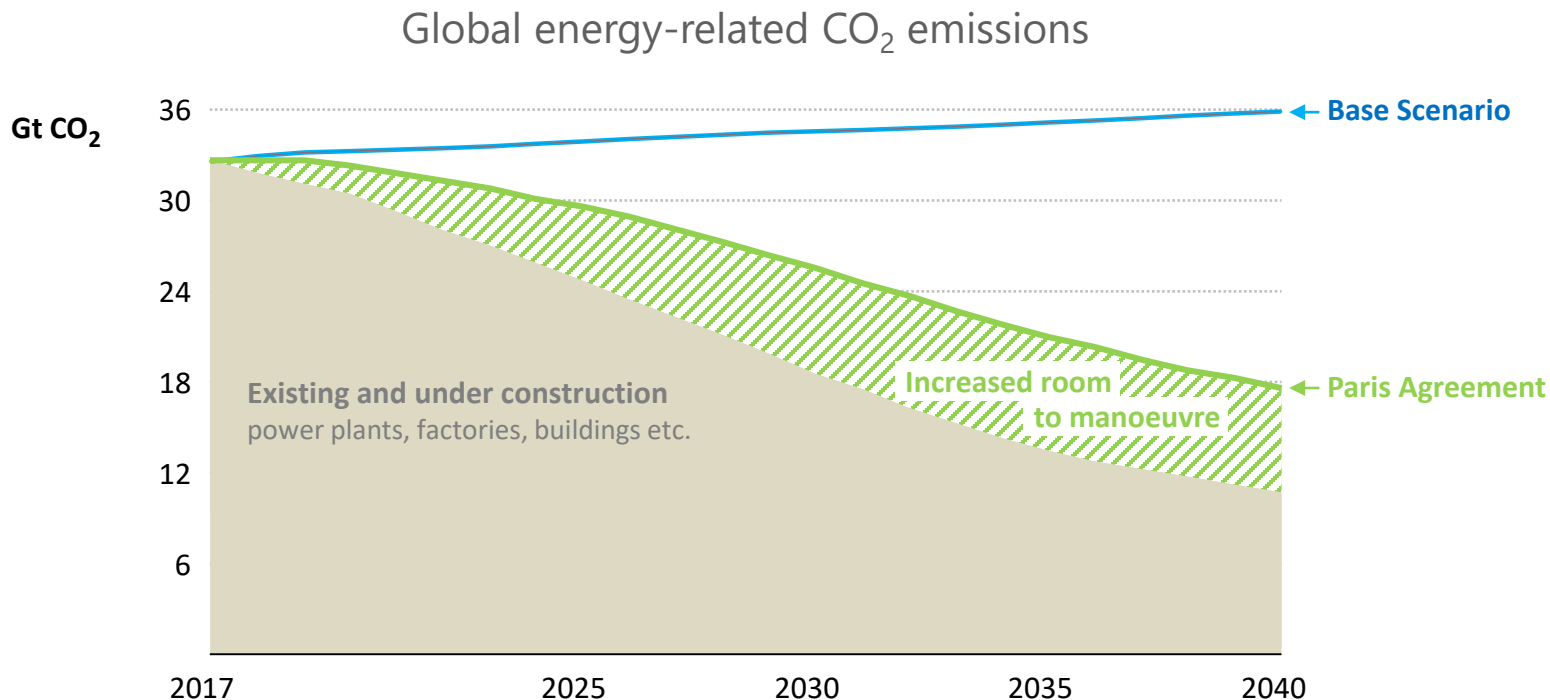
*The contribution of nuclear power could decline substantially in leading markets, while large growth is coming, as China takes first position within a decade*

# 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*

- The links between energy & geopolitics are strengthening & becoming more complex, a major factor in the outlook for energy security
- New dynamics in the oil demand and supply balance lead to unprecedented volatility in oil markets
- 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

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