World Energy Outlook 2018

ALPS Symposium
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Insights on electricity transitions from the World Energy Outlook 2018

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Context

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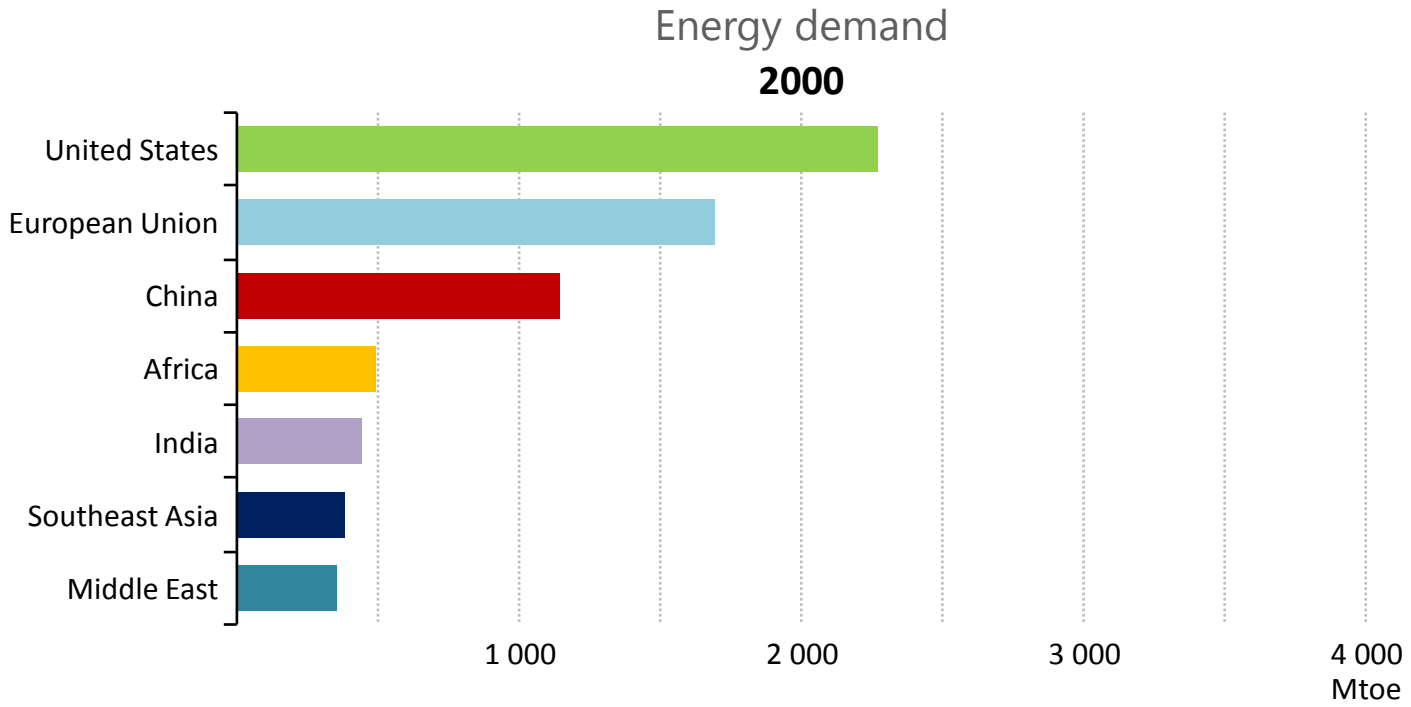
- Electricity is increasingly important in the modern world, to date:
  - Electricity demand has been growing twice as fast as total energy demand
  - Investment in the power sector is larger than that in the oil and gas sector
  - The rise of solar PV and wind power is transforming electricity supply
  - Overall energy-related CO_2 emissions are back on a rising trend in 2018
  - For the first time, the global population without access to electricity fell below 1 billion
- 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 Future is Electric Scenario was introduced to explore the implications of more rapid electrification of end uses and the digitalization of the economy

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.

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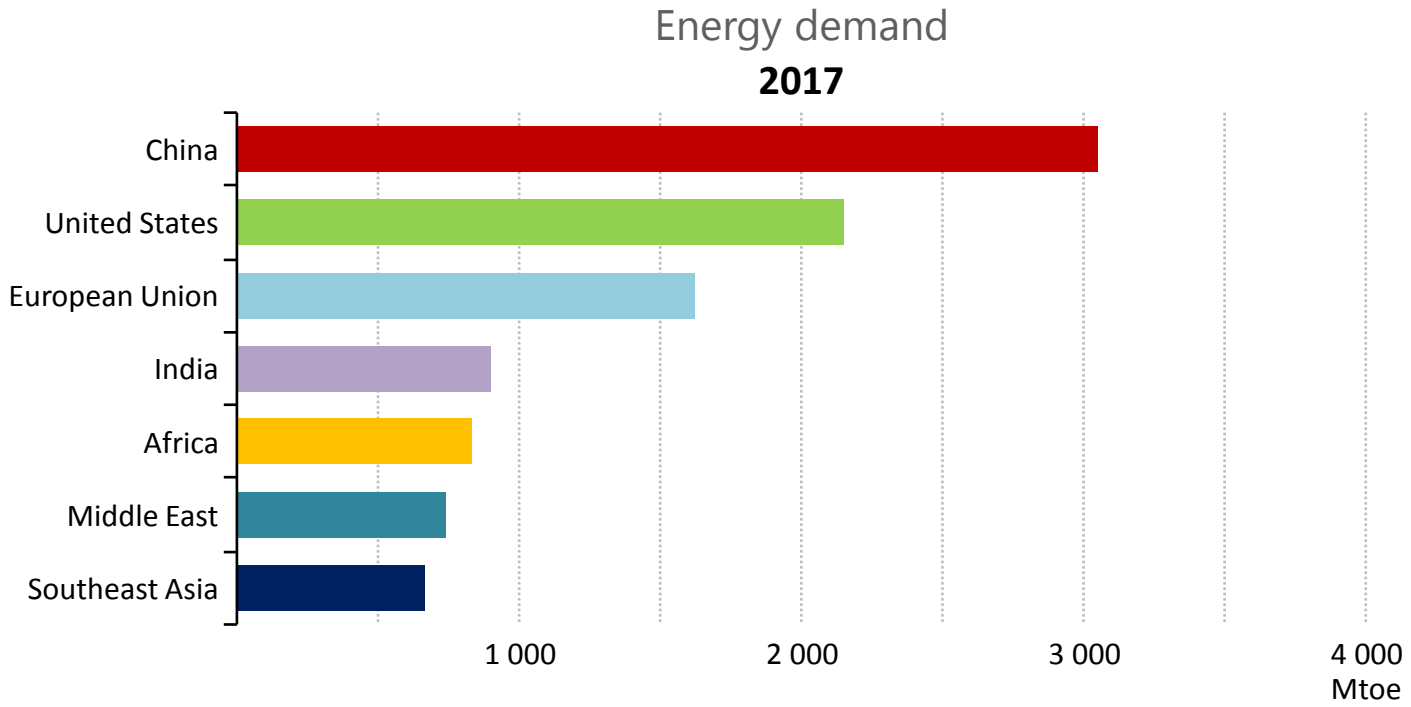

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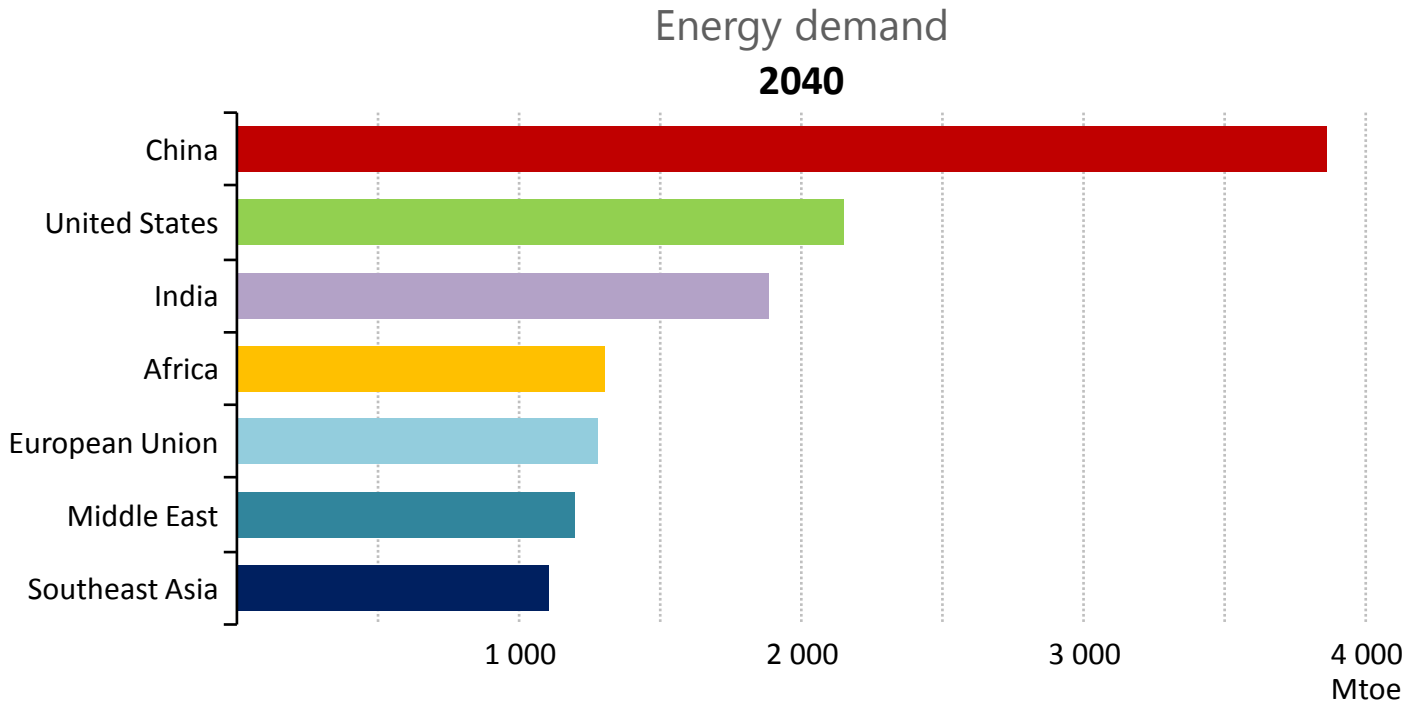

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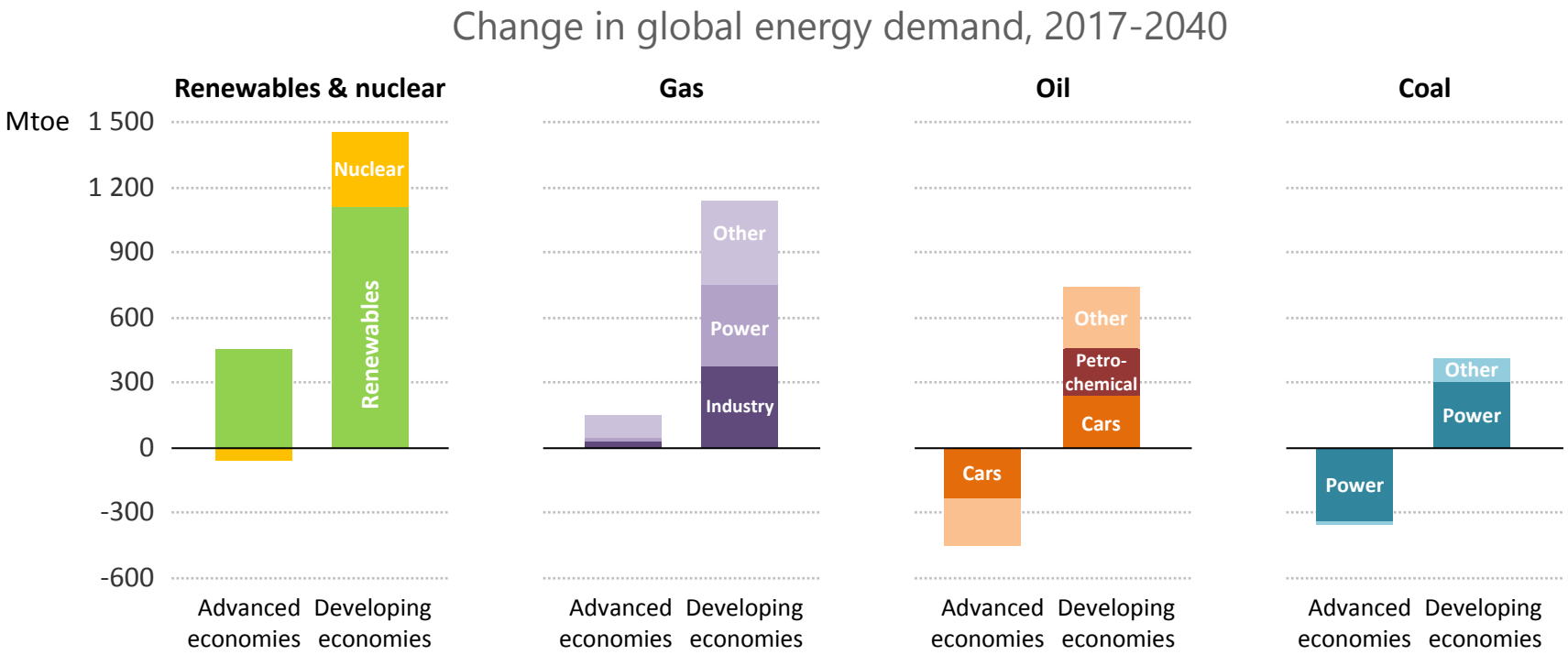
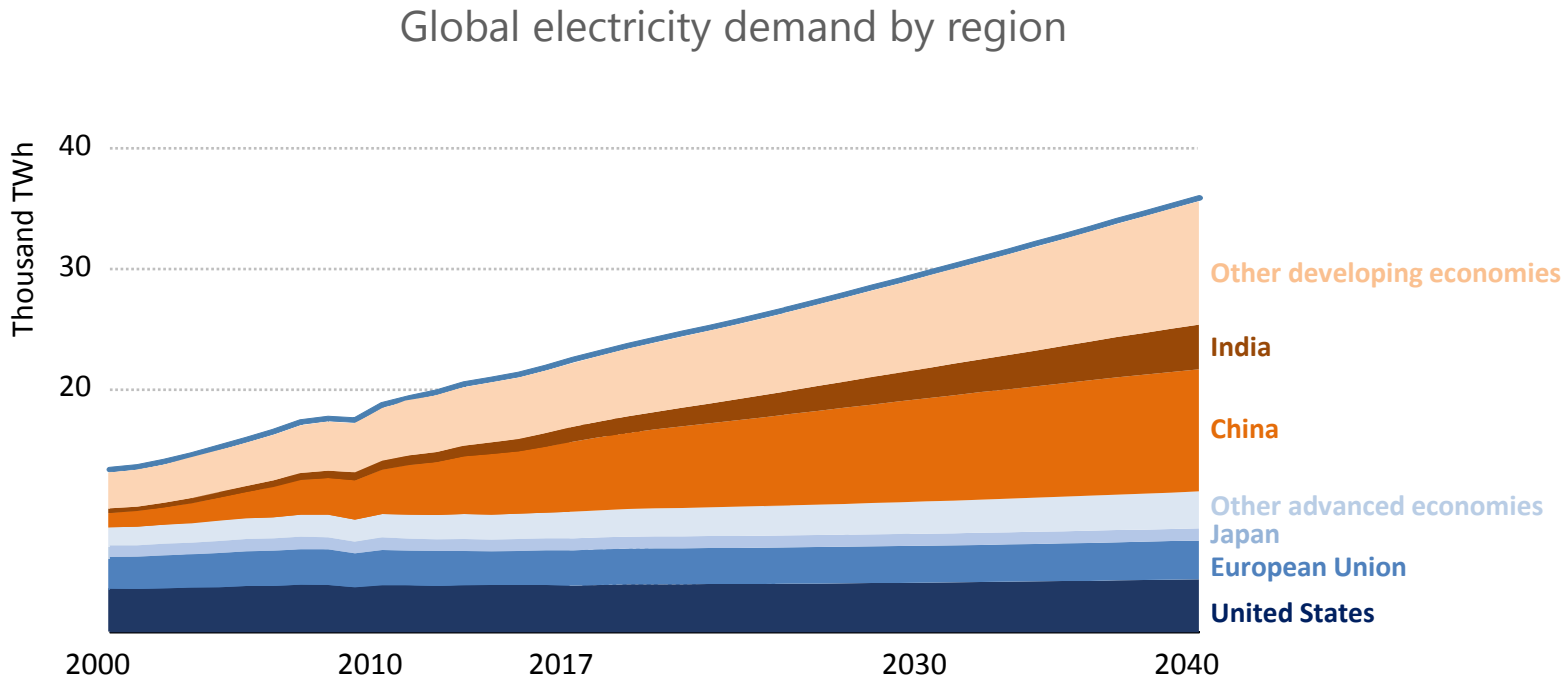
Fuelling the demand for energy



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

Electricity, the fastest growing "fuel"



In 2000, developing economies accounted for one-third of electricity demand, by 2040, their share doubles as they account for most of the electricity growth

Solar PV growth outpaces all other technologies

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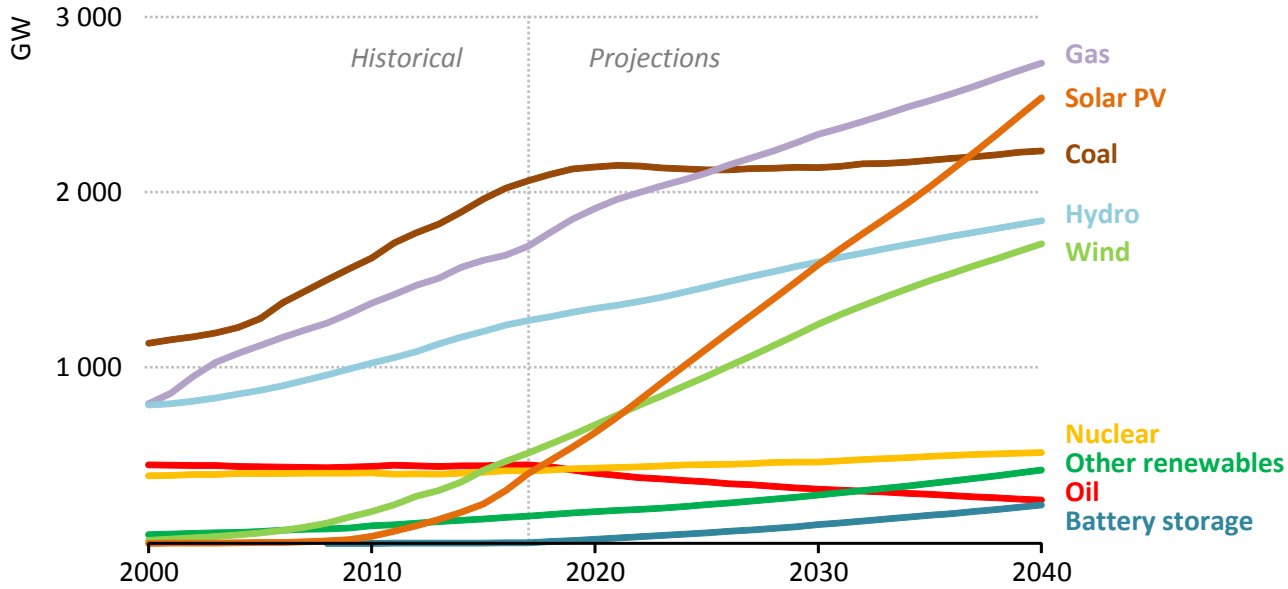
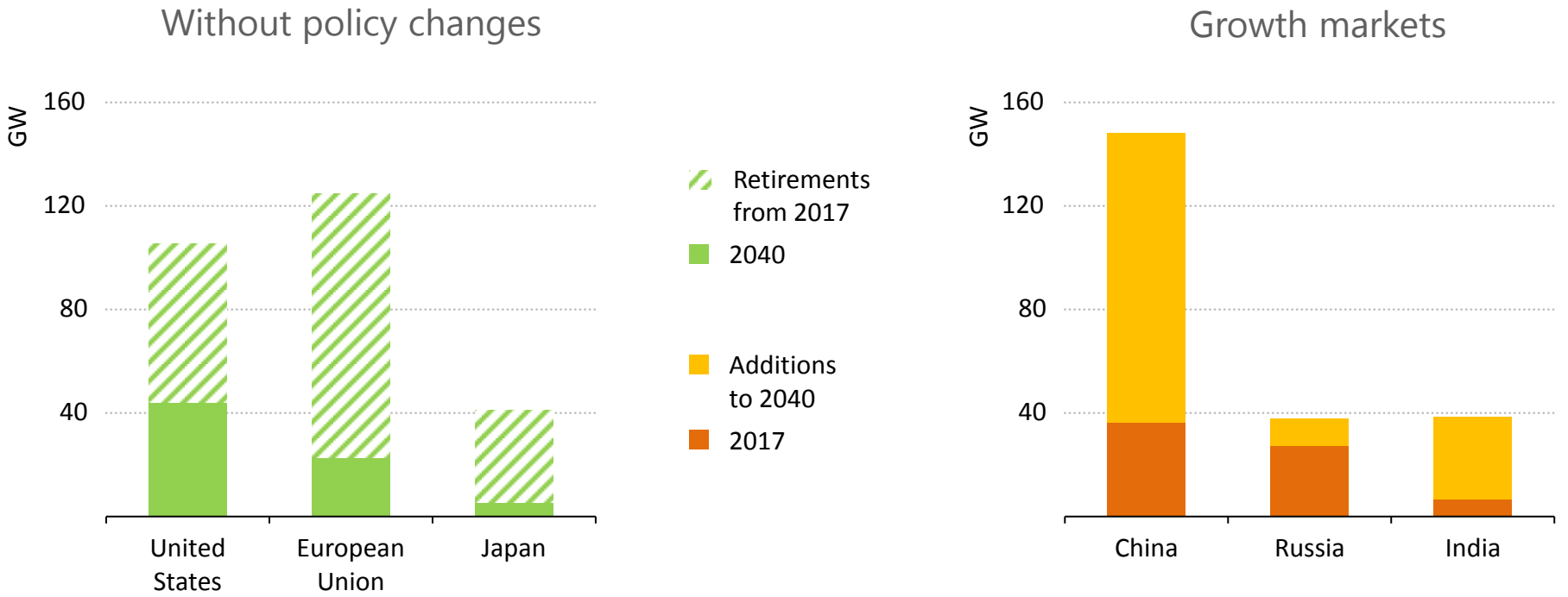
Installed power generation capacity by source in the New Policies Scenario



Renewables make up two-thirds of all capacity additions worldwide to 2040, capturing 70% of power plant investment

Two directions for nuclear power



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

The electricity landscape is transforming

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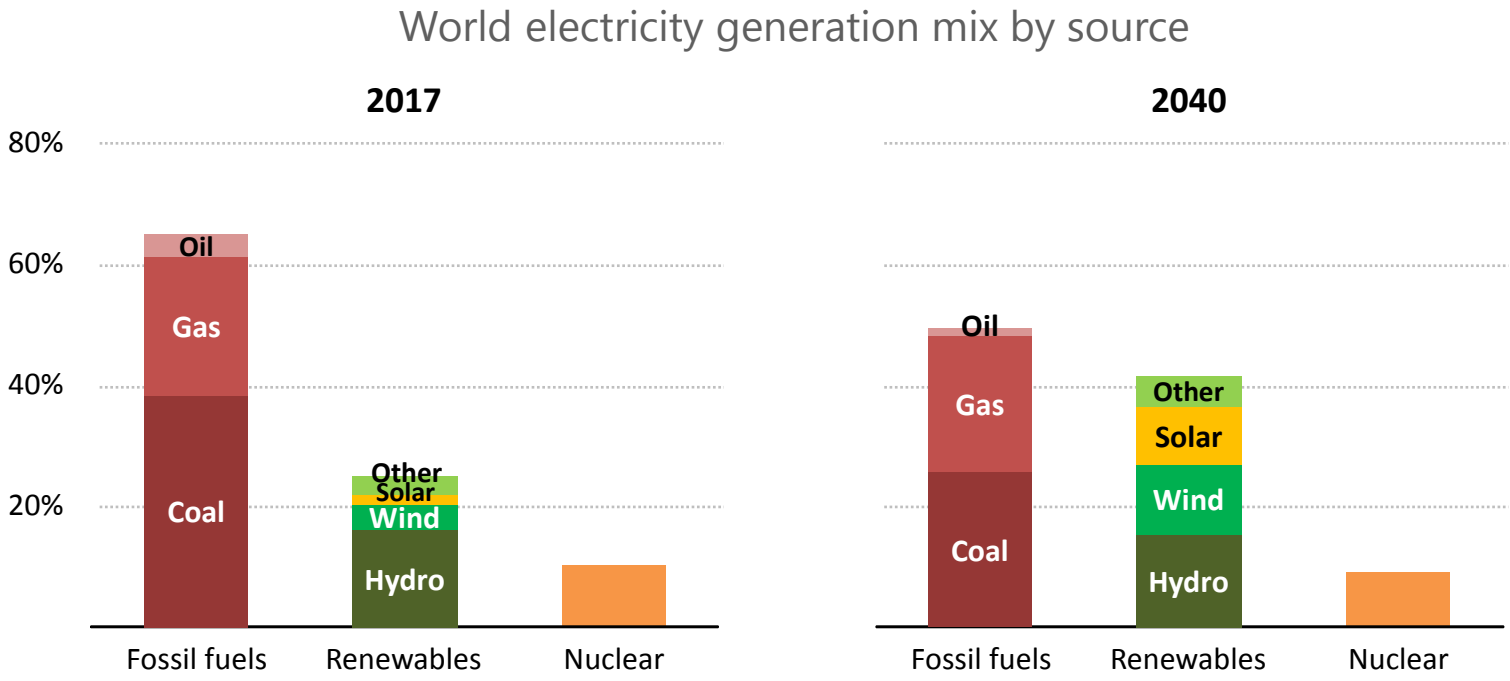

Coal and renewables switch roles by 2040, mainly driven by policy support and accelerated by the improving competitiveness of renewables

Flexibility: the cornerstone of tomorrow's power systems

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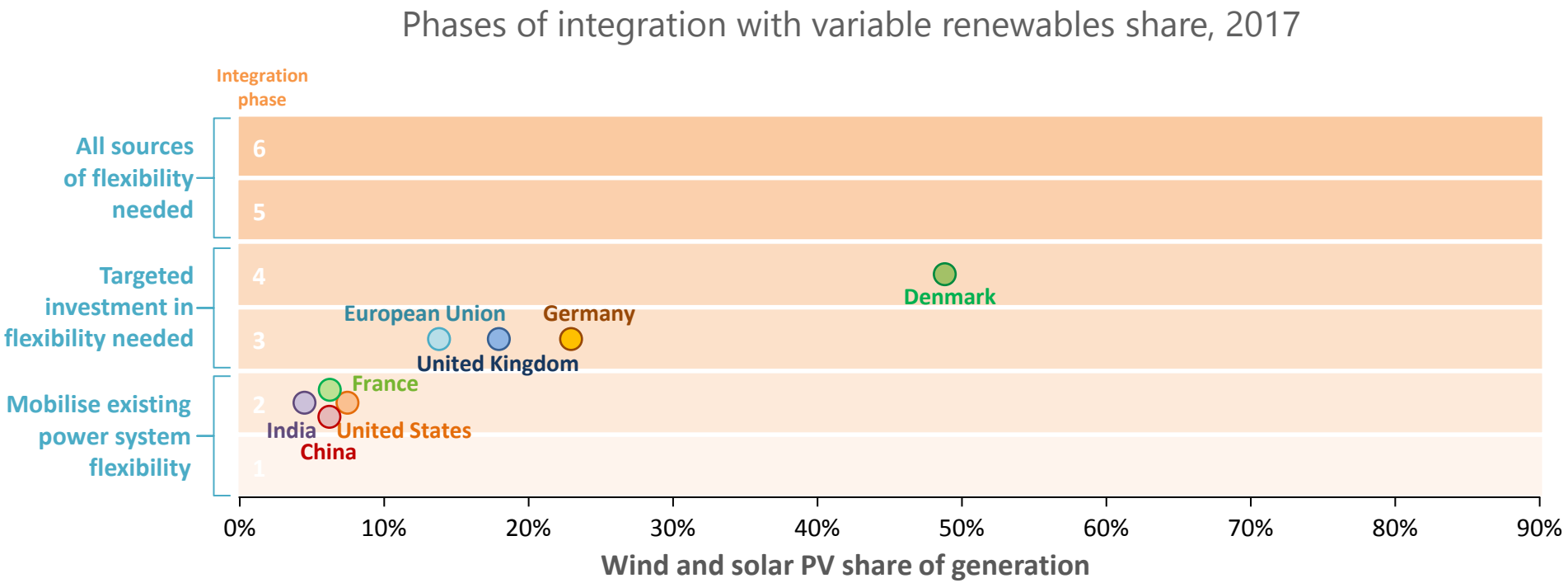

Higher shares of variable renewables raise flexibility needs and call for reforms to deliver investment in power plants, grids & energy storage, and unlock demand-side response

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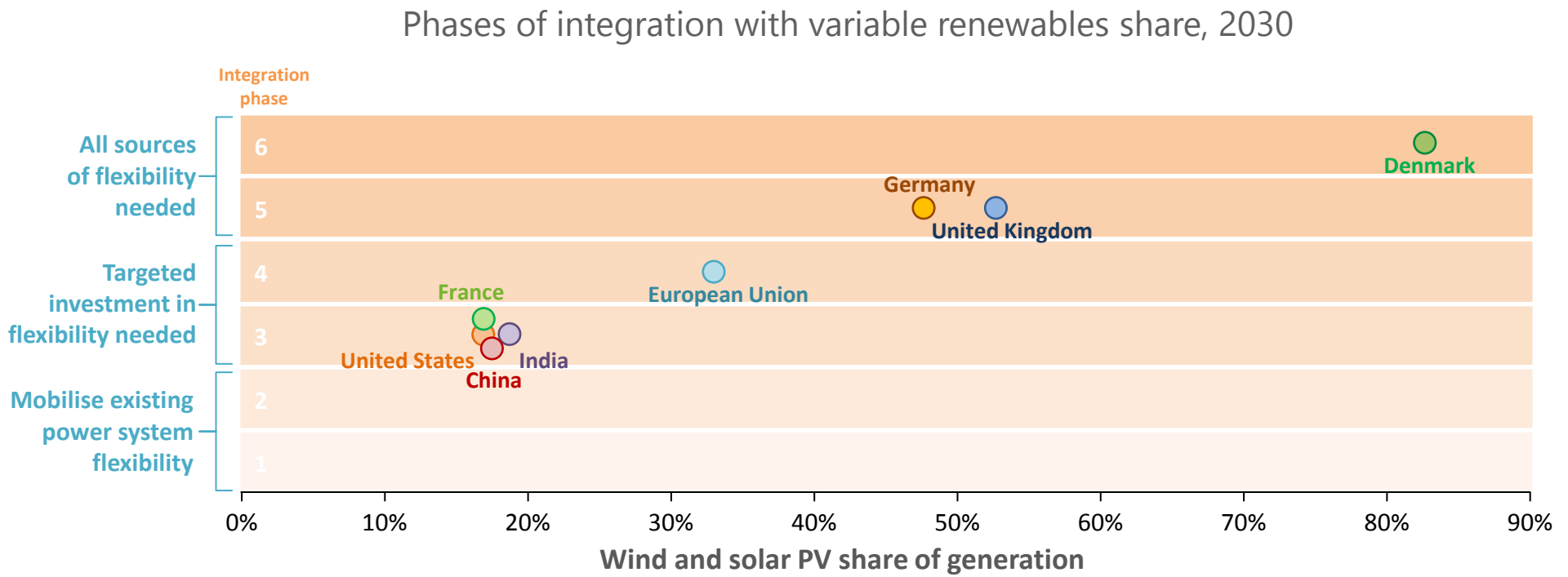

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Our energy destiny lies with governments

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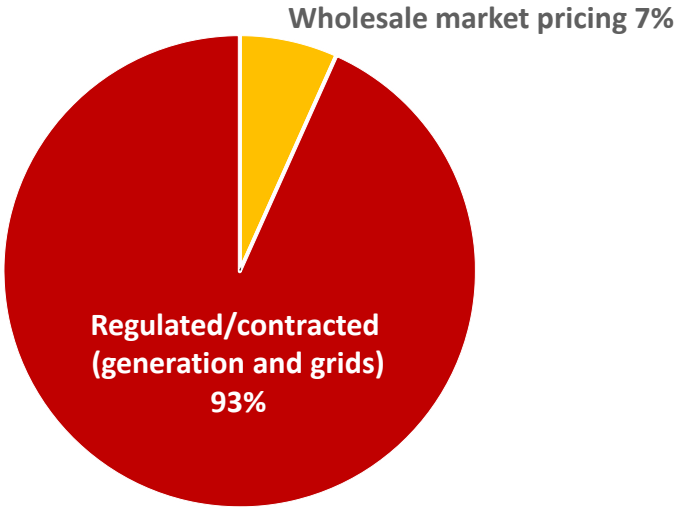
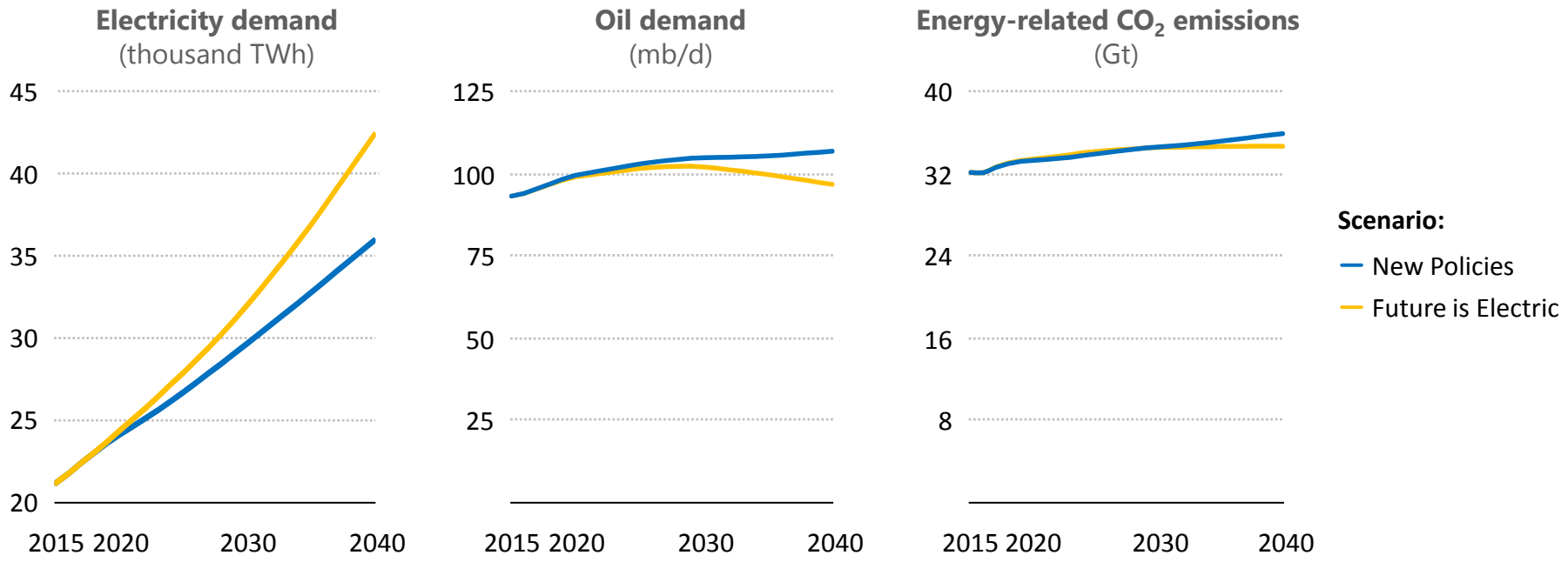
Power sector investment to 2040
$20 trillion



Power sector investment continues to be driven by regulated market frameworks

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_2 emissions reductions

Accelerating action in power is key to the energy transition

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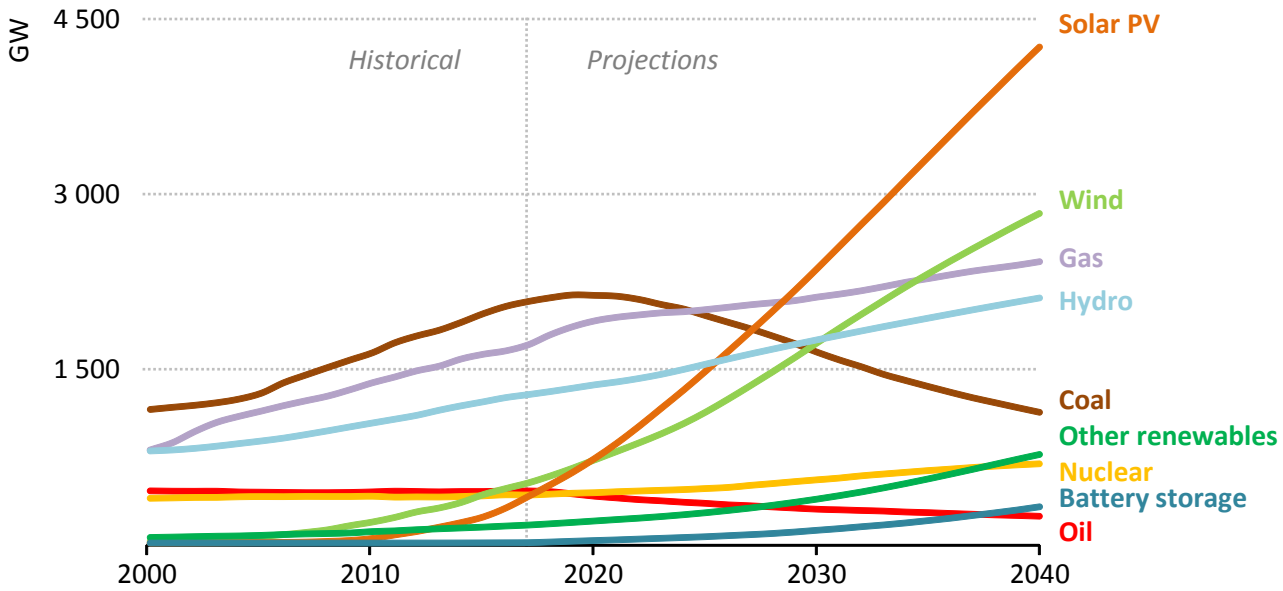
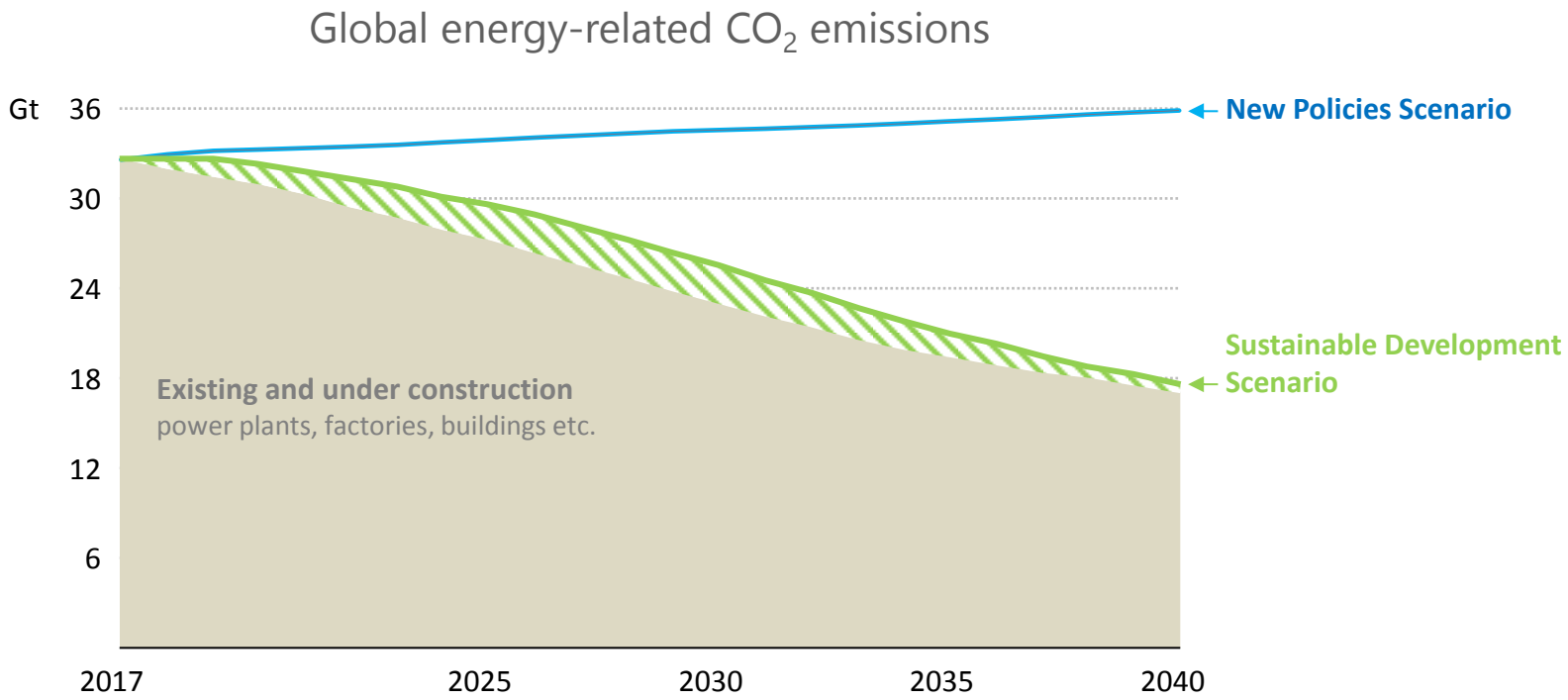
Installed power generation capacity by source in the Sustainable Development Scenario



Coal-fired power capacity without CCUS declines by two-thirds to 2040, while solar and wind power move in front, reaching half of total installed capacity

Can we unlock a different energy future?



Coal plants make up one-third of CO_2 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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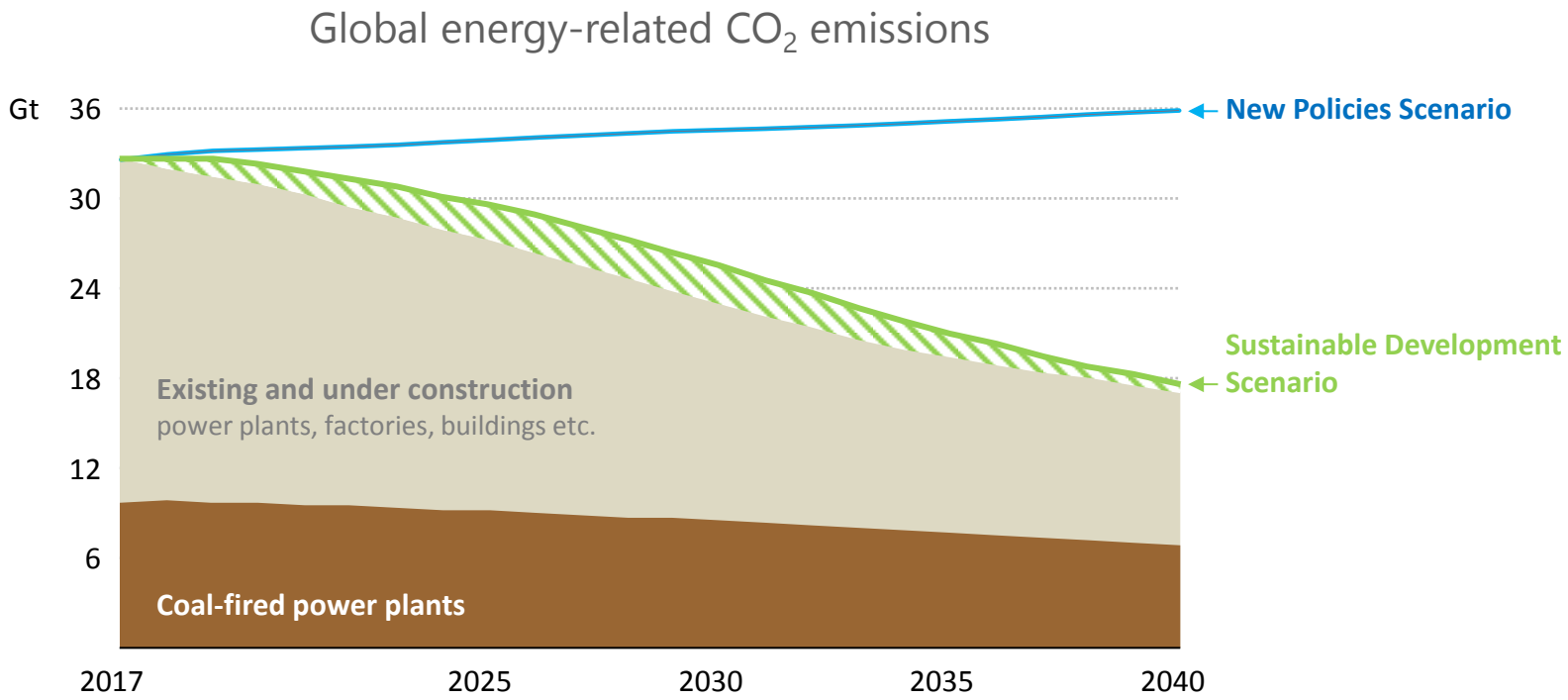

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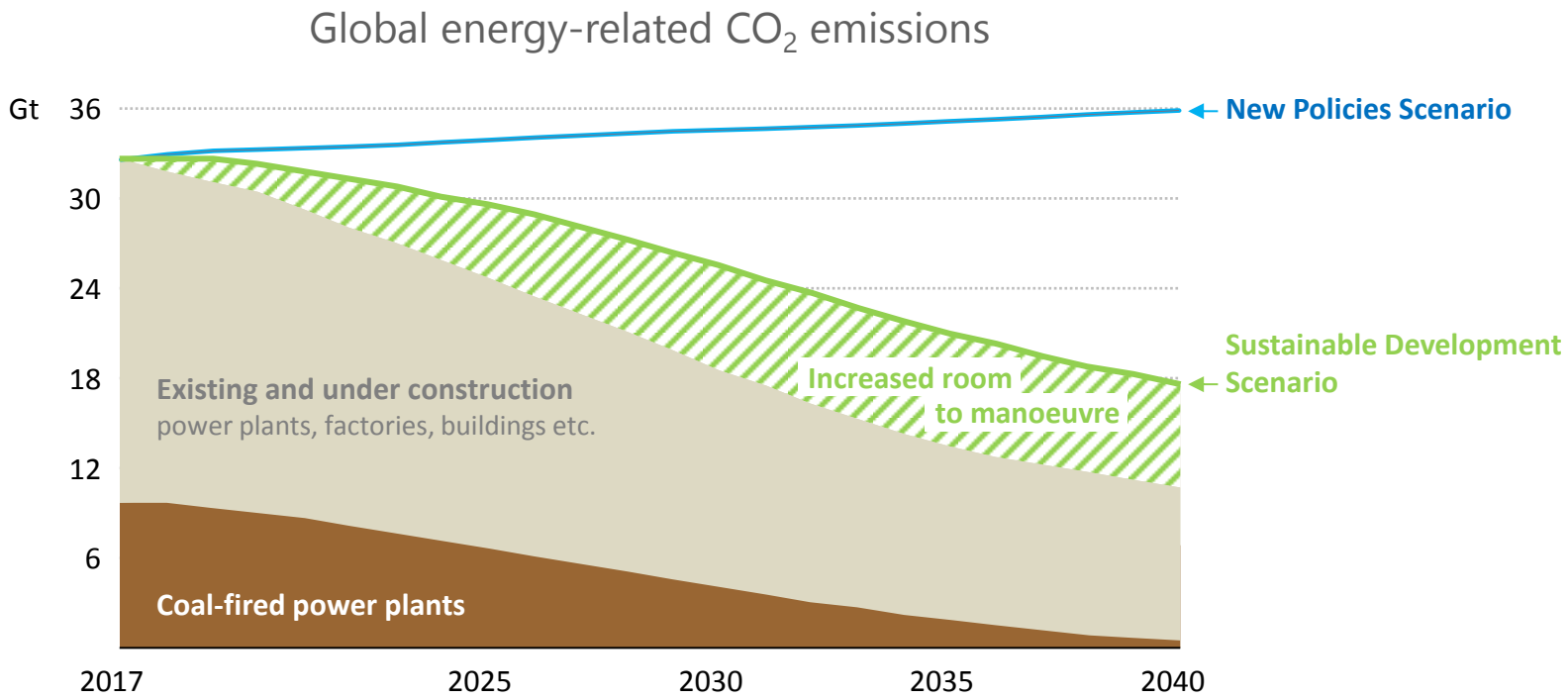

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Conclusions

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- The rapid growth of electricity brings huge opportunities; but market designs need to deliver both electricity *and* flexibility to keep the lights on
- A comprehensive strategy to electrify end uses and decarbonise the power sector is needed to achieve environmental goals
- There is no single solution to turn emissions around: renewables, efficiency & a host of innovative technologies, including storage, CCUS & hydrogen, are all required
- Achieving energy for all is essential for achieving the Sustainable Development Goals, especially for improving livelihoods, health, gender equality and education
- The future pathway for energy is open: governments will determine where our energy destiny lies

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