World Energy Outlook 2018

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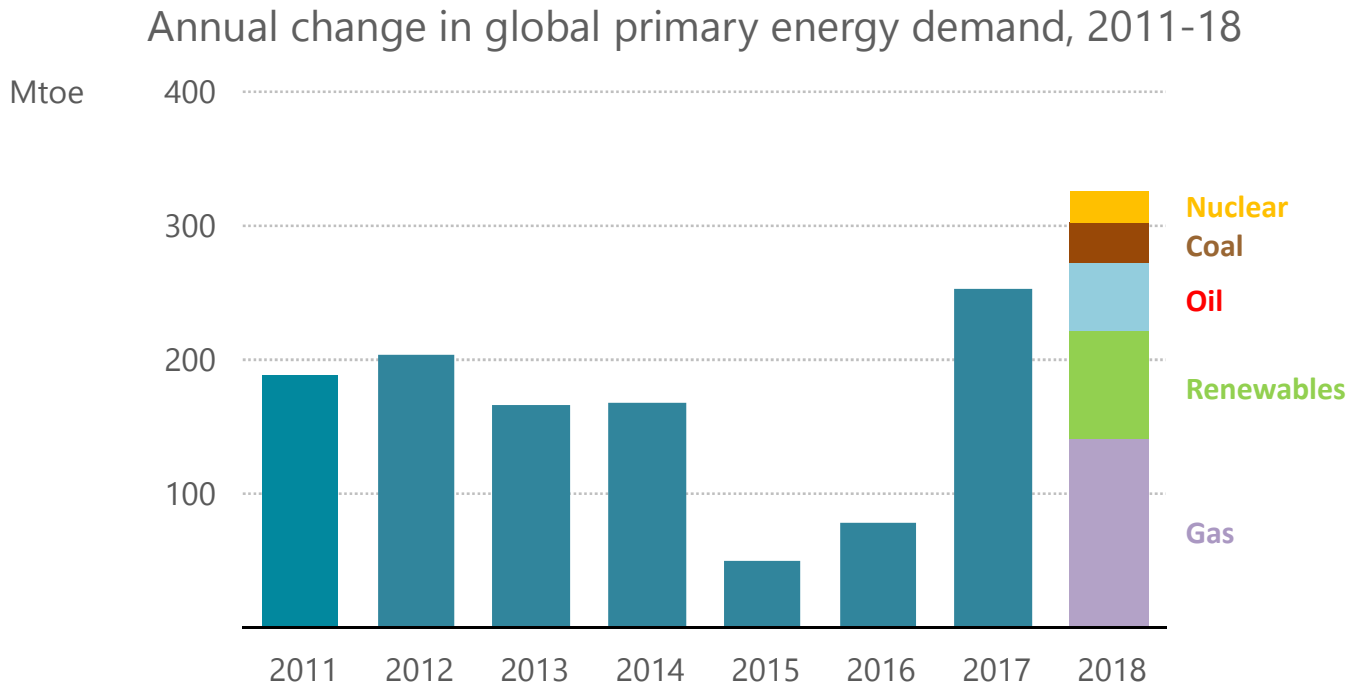
Today's energy context

World Energy Outlook 2018

- 2018 was a remarkable year for energy, yet mixed signals remain for the future:
  - Natural gas was the fuel of choice in 2018, led by demand growth in the US and China
  - Oil demand was up 1.3 mb/d in 2018, yet markets are entering a period of uncertainty
  - Renewables addition stalled and are outpaced by electricity demand
  - Energy-related CO_2 emissions reached a historic high of 33.1 Gt in 2018, up 1.7% on 2017
  - The global population without access to electricity is now 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

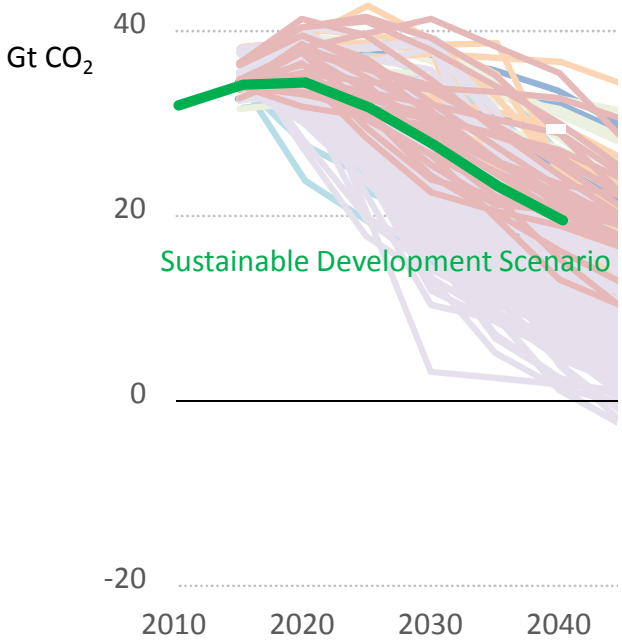
2018 – a remarkable year for energy



Global energy demand last year grew by 2.3%, the fastest pace this decade, an exceptional performance driven by a robust global economy, weather conditions and moderate energy prices.

The SDS is fully in line with the Paris Agreement

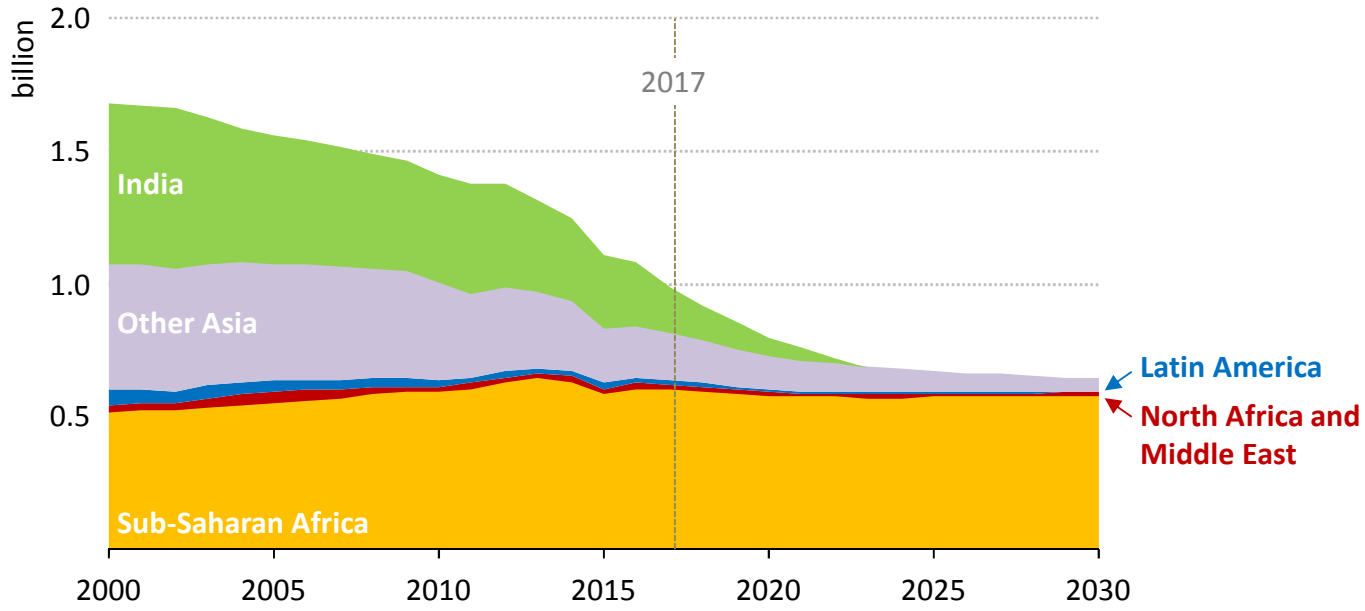
Energy sector and industrial process CO_2 emissions in SDS and scenarios included in IPCC SR1.5



The CO_2 emissions trajectory to 2040 in the SDS is at the lower end of a range of scenarios projecting a global temperature rise of 1.7-1.8 °C in 2100

Electrification in Africa requires significant boost

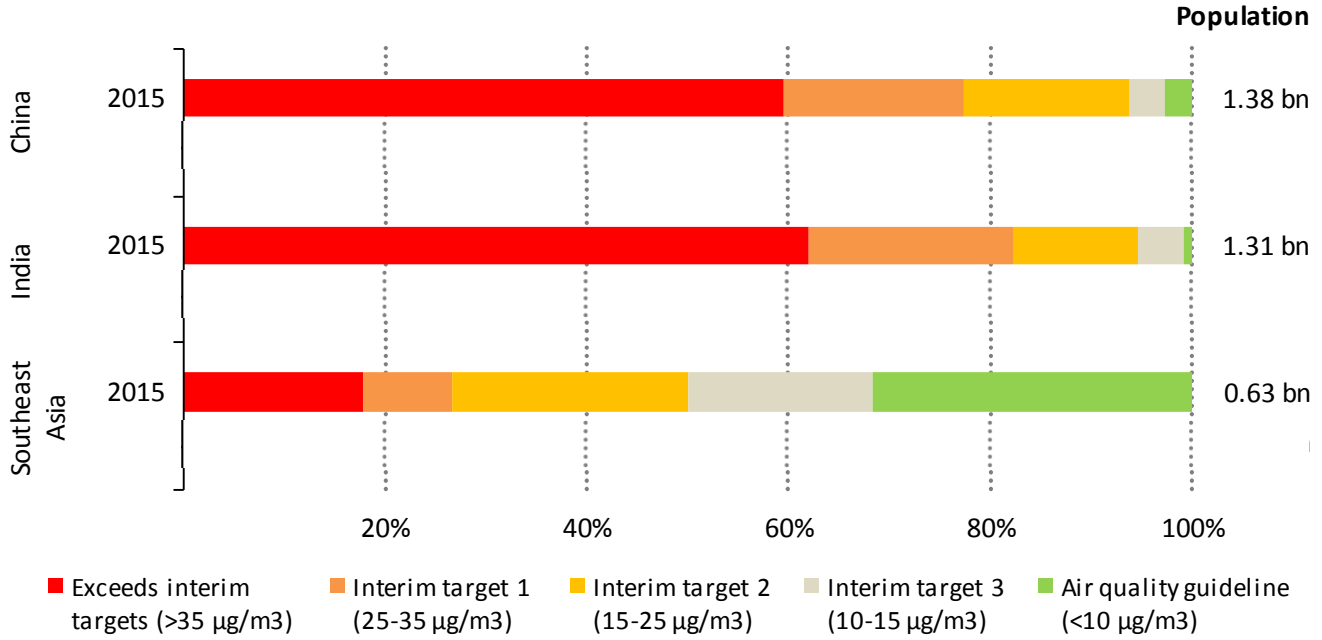
Population without electricity access in the New Policies Scenario



The world population without electricity access fell below 1 billion in 2017, led by India; but despite recent progress, efforts in sub-Saharan Africa need to redouble

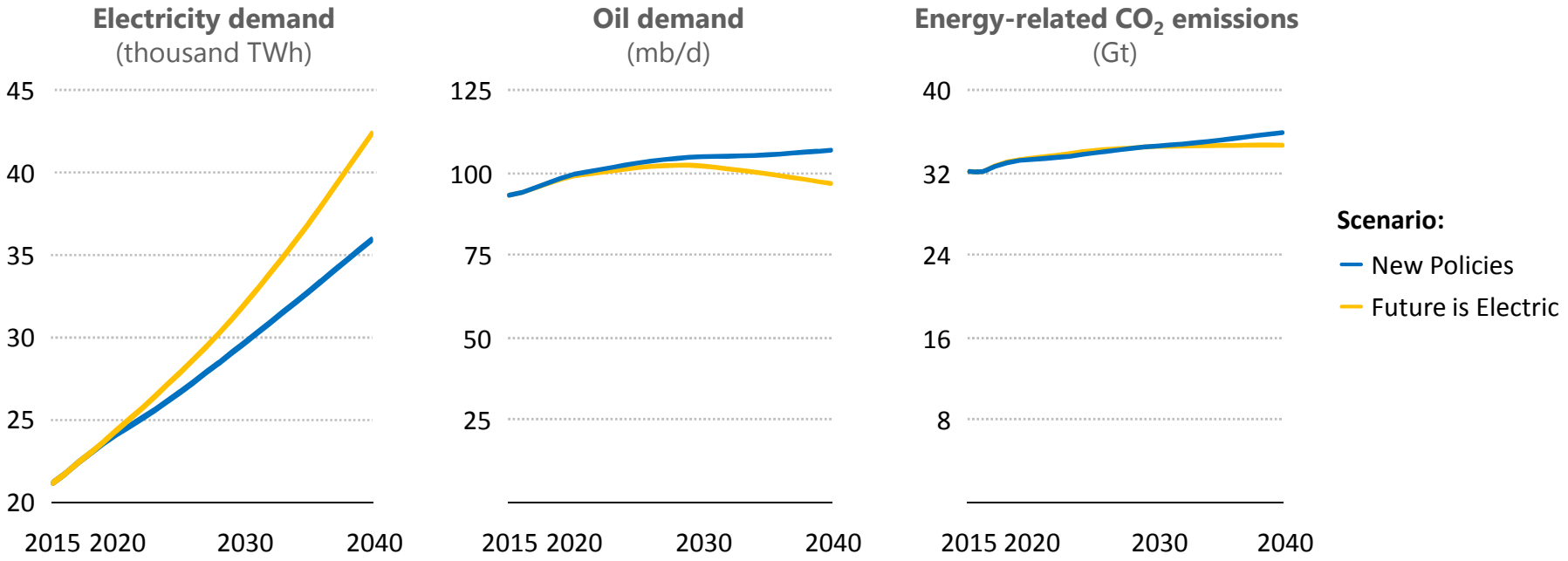
Air pollution in cities requires action on energy

Exposure to fine particulates (PM2.5) in 2015, and in the Sustainable Development Scenario, 2040



Today more than 5 million premature deaths are attributed to air pollution, a number set to rise unless action is taken to reduce air pollution from the energy sector.

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

Flexibility: the cornerstone of tomorrow's power systems

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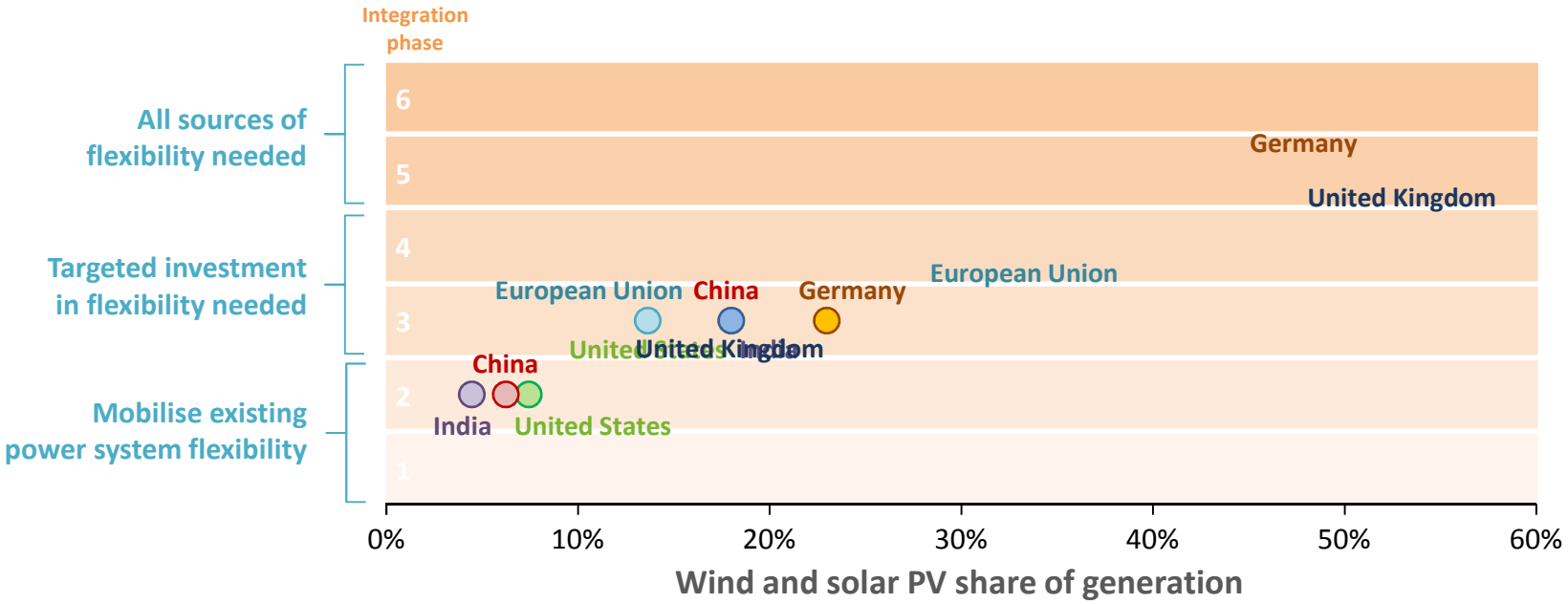
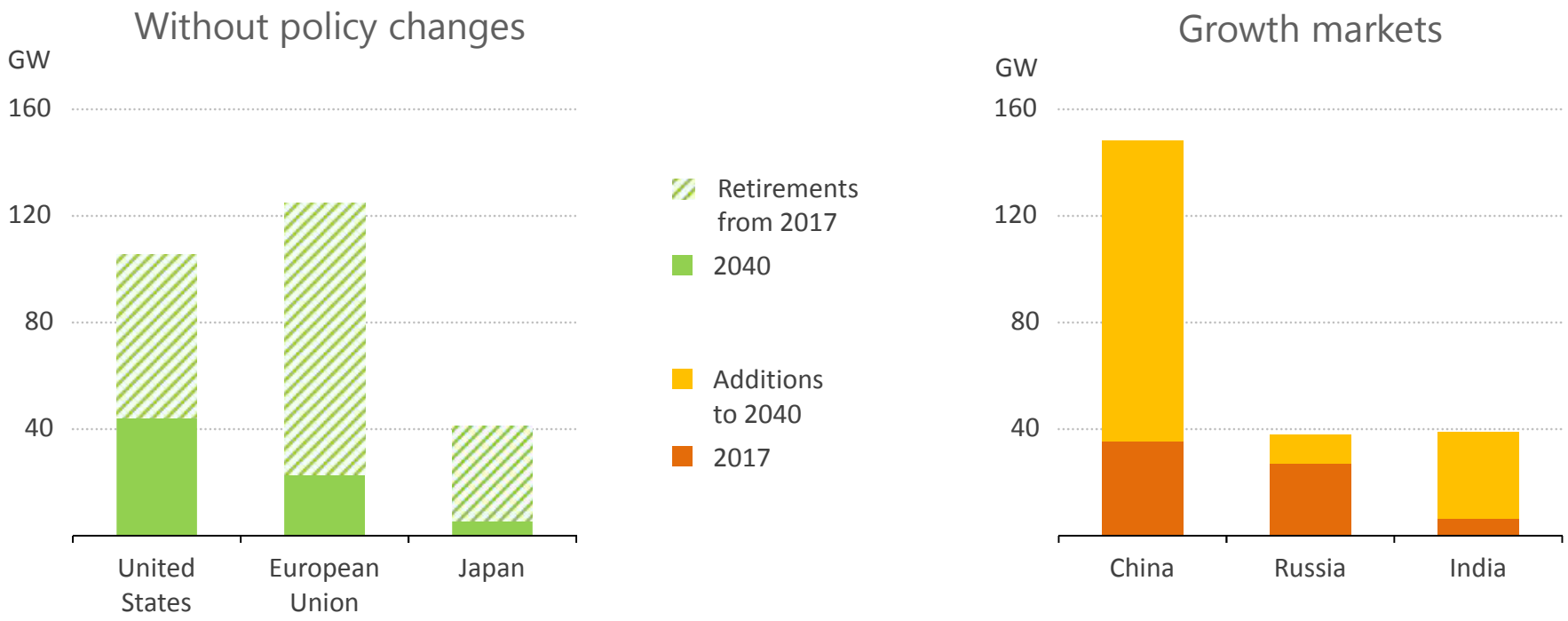
Phases of integration with variable renewables share, 2030



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 changes to policy, the contribution of nuclear power could decline substantially in leading markets, while growth is coming, as China takes first position within a decade

Looking beyond the levelised cost of electricity

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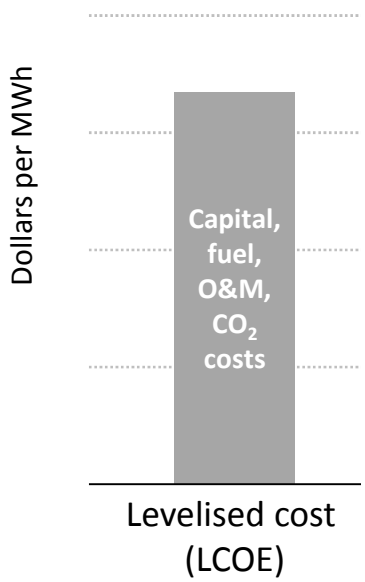
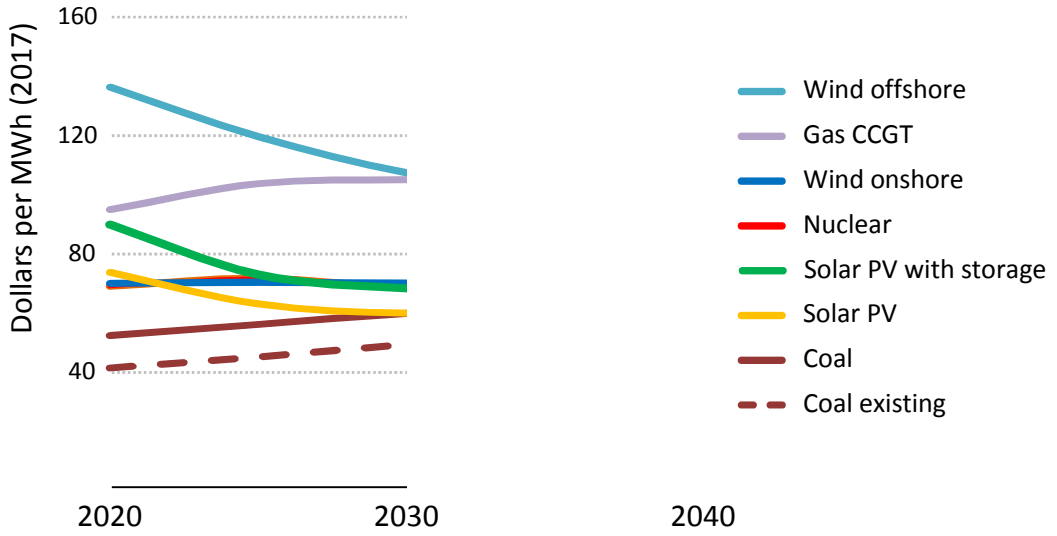
Technology costs and value



Value-adjusted LCOEs in China



Costs remain an important indicator of competitiveness, but better metrics are needed to reflect the changing nature and needs of power systems

Can we unlock a different energy future?

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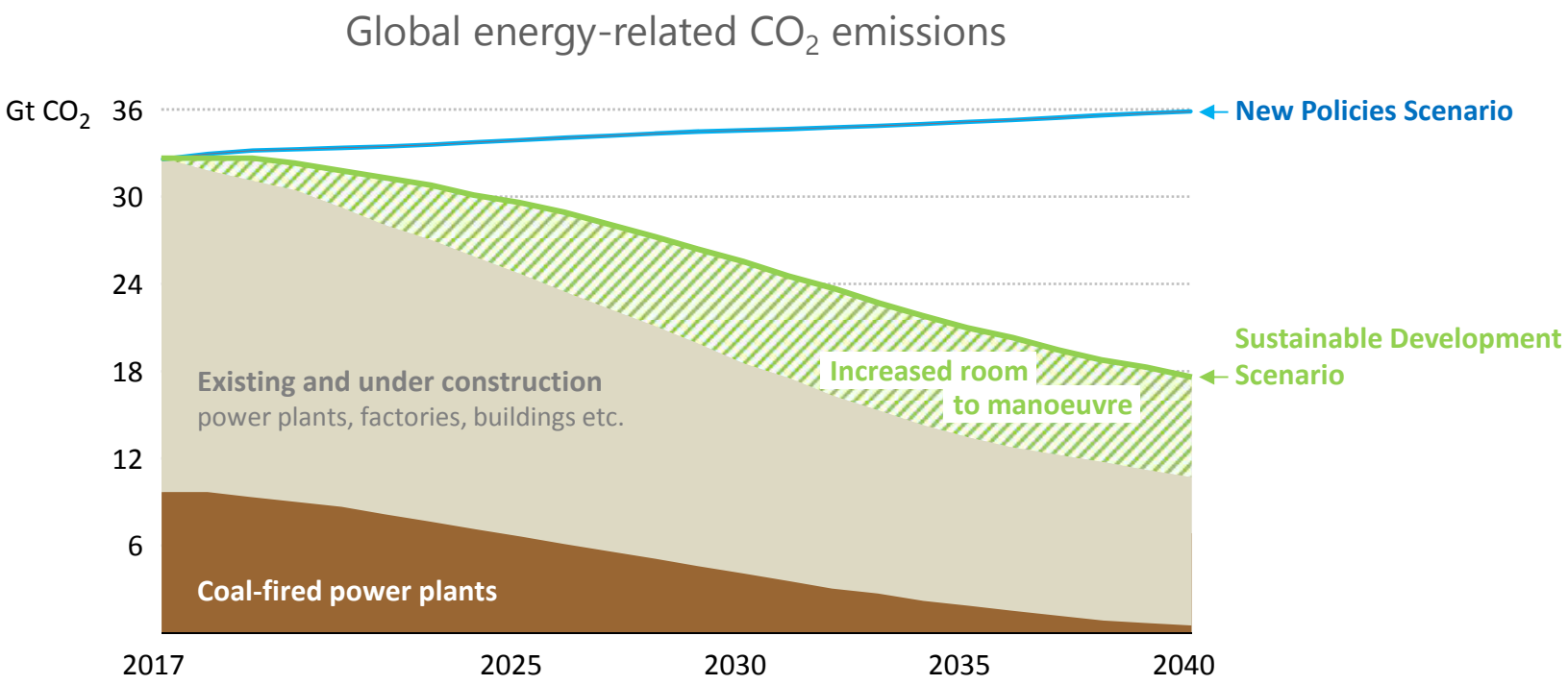
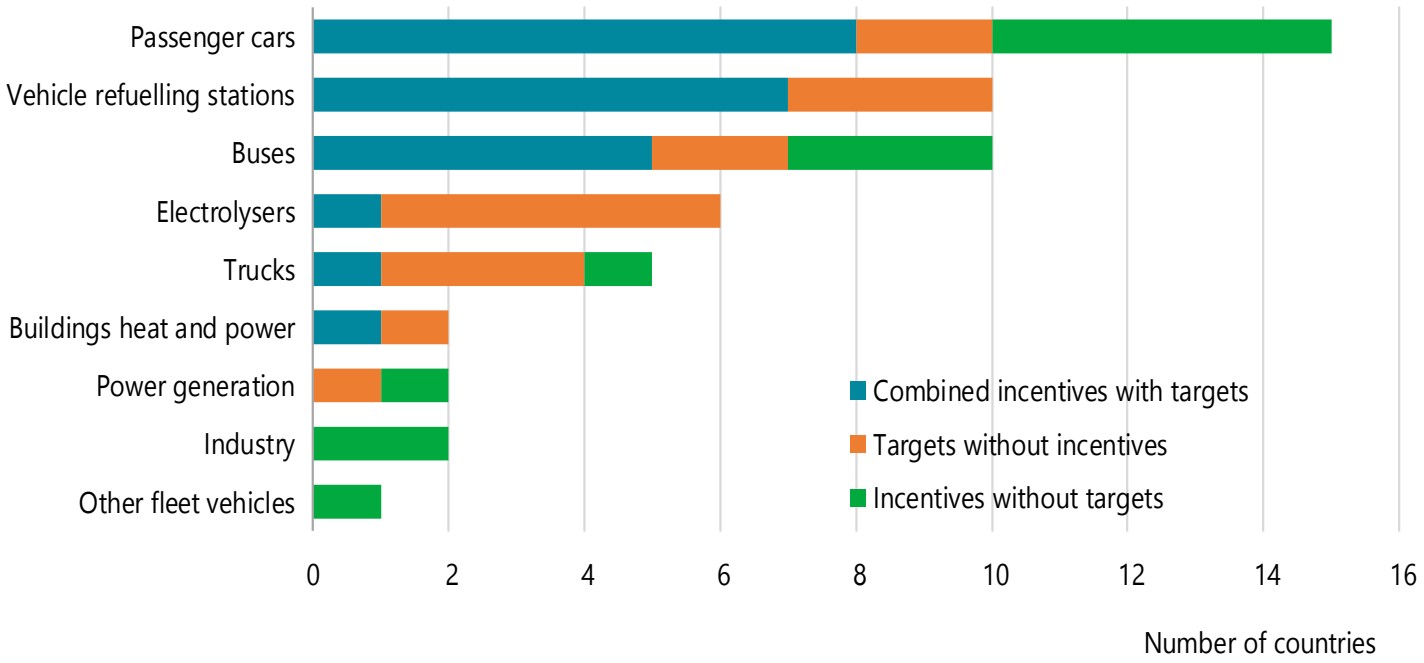


Coal plants make up one-third of CO_2 emissions today and half are less than 15 years old; policies are needed to support CCUS, efficient operations and technology innovation

Renewed interest in hydrogen reflected in policy action



Around 50 targets, mandates or incentives in place, mainly focusing on transport; among G20 countries and EU, 11 have hydrogen policies; 9 have national hydrogen roadmaps

Conclusions

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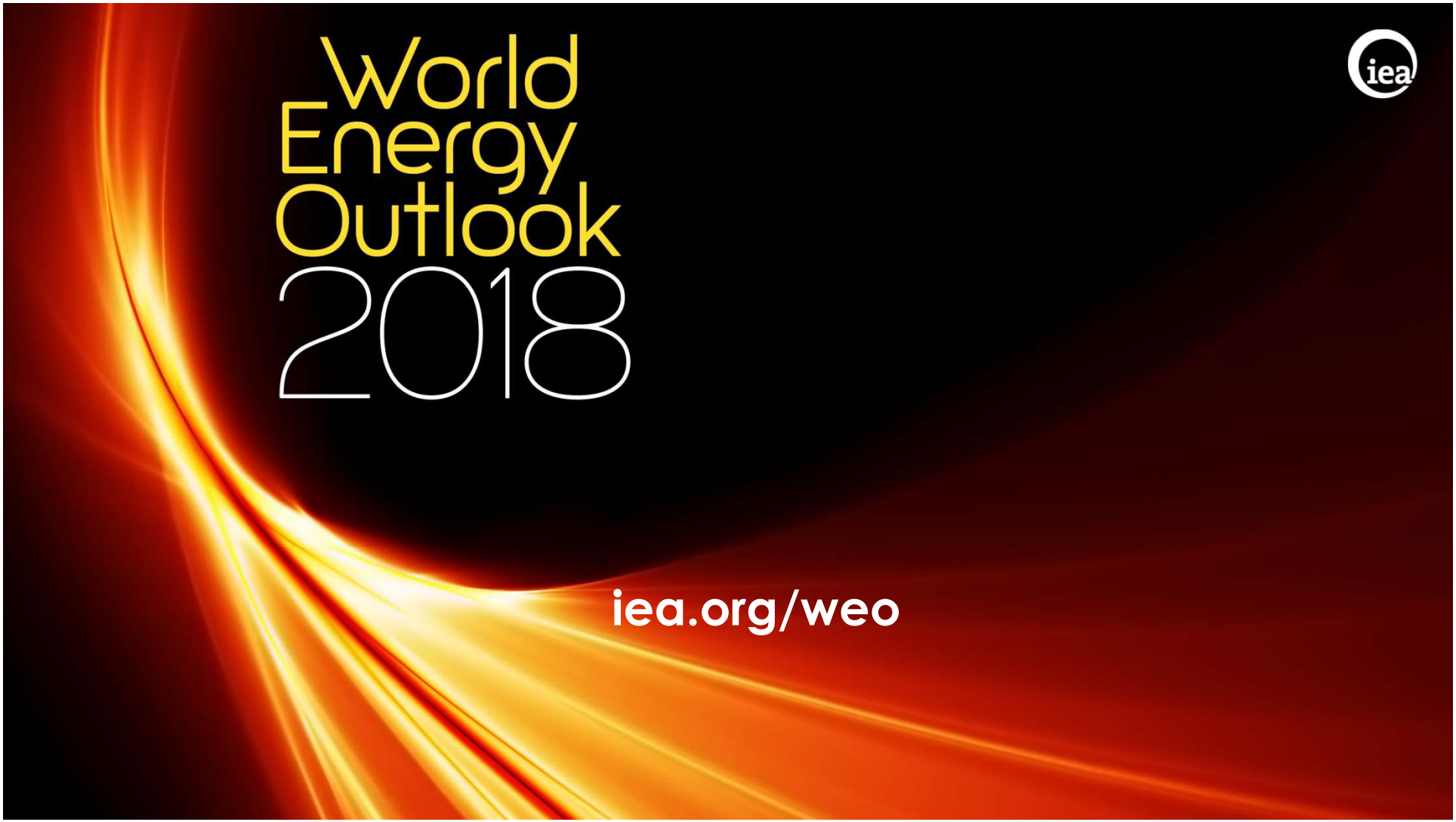
- Under current and planned policies targets on climate, energy access and local air pollution will not be met.
- Moving to a more sustainable pathway requires: renewables, pollution control efficiency & other innovative technologies, including storage, CCUS & hydrogen
- The rapid growth of electricity brings huge opportunities; but market designs need to deliver both electricity and flexibility for secure & cost-effective transitions
- The IEA is ready to support governments, industry and academia, with data, analysis, an "All-Fuels-And-All-Technologies " approach and real-world solutions
- As part of our efforts to chart a path to a sustainable and secure energy future we are hosting the 2019 International Energy Workshop in Paris from June 3rd to 5th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