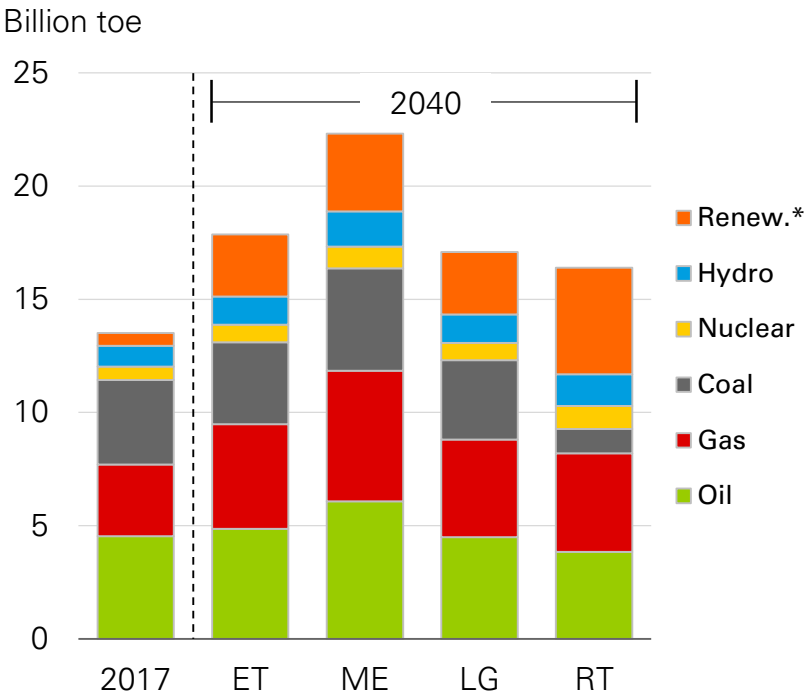
BP Energy Outlook
2019 edition

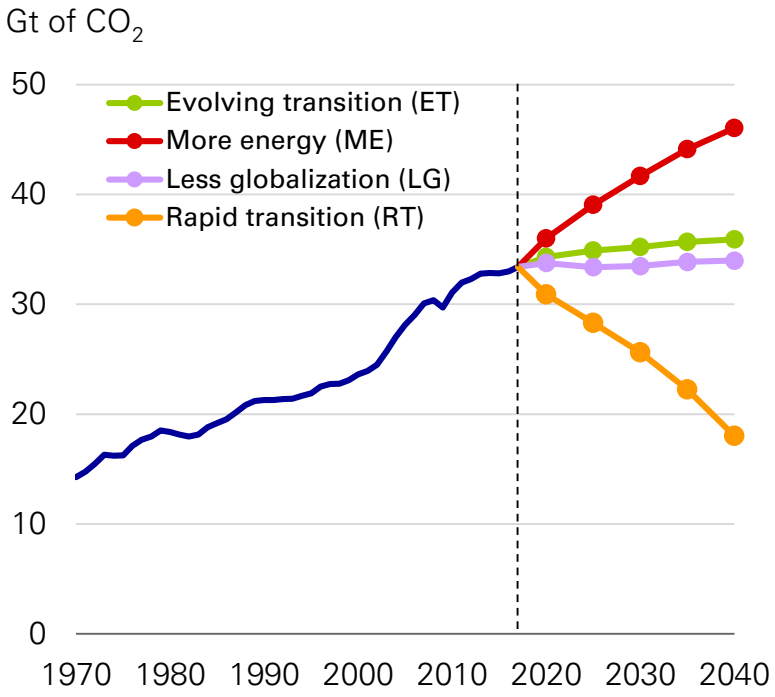
Spencer Dale
Group chief economist

Energy Outlook scenarios

Primary energy consumption by fuel



CO_2 emissions



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

2019 BP Energy Outlook

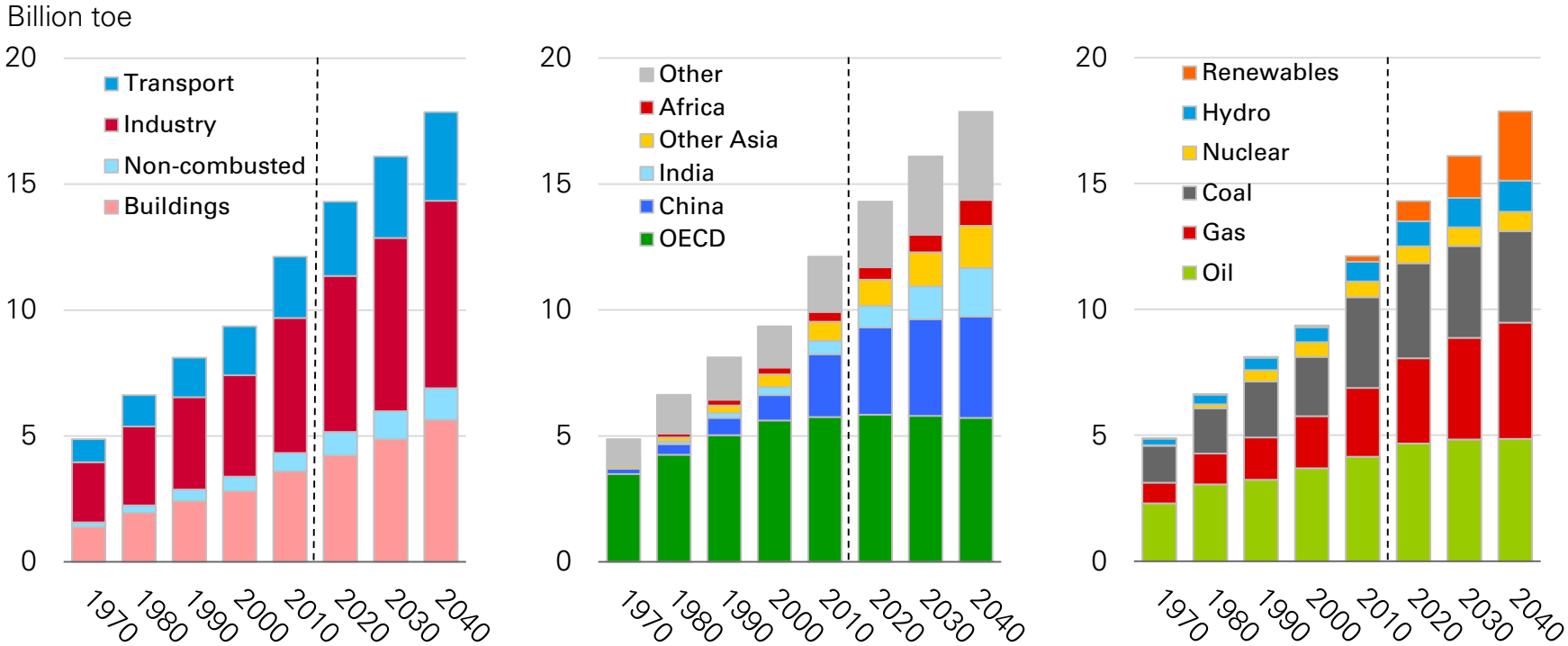
Three windows on the energy transition

Primary energy demand

End-use sector

Region

Fuel



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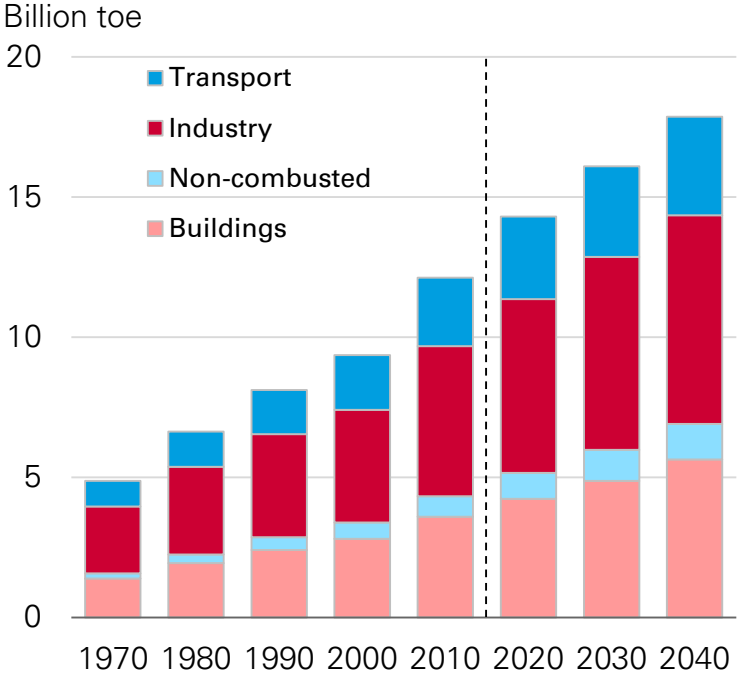
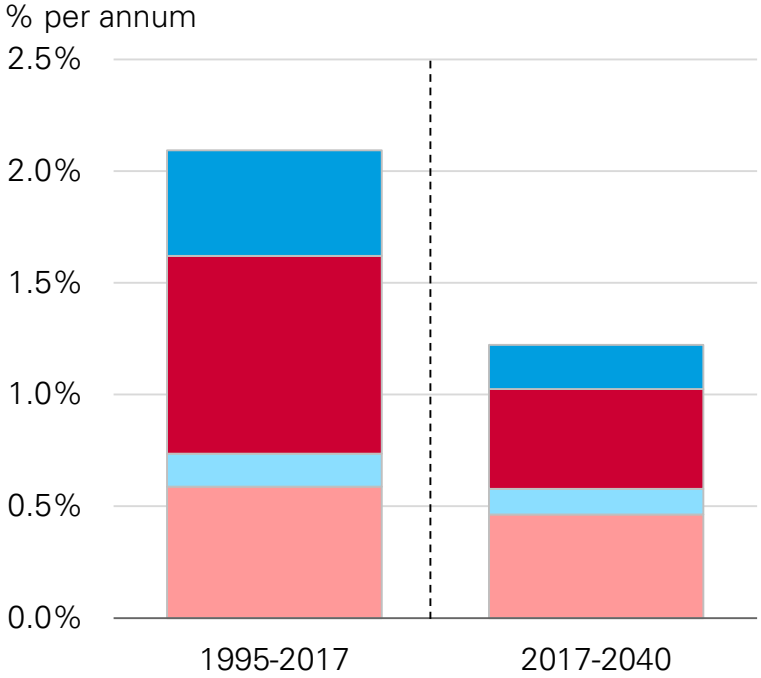
Energy demand by sector

Primary energy consumption by end-use sector



Annual demand growth and sector contributions



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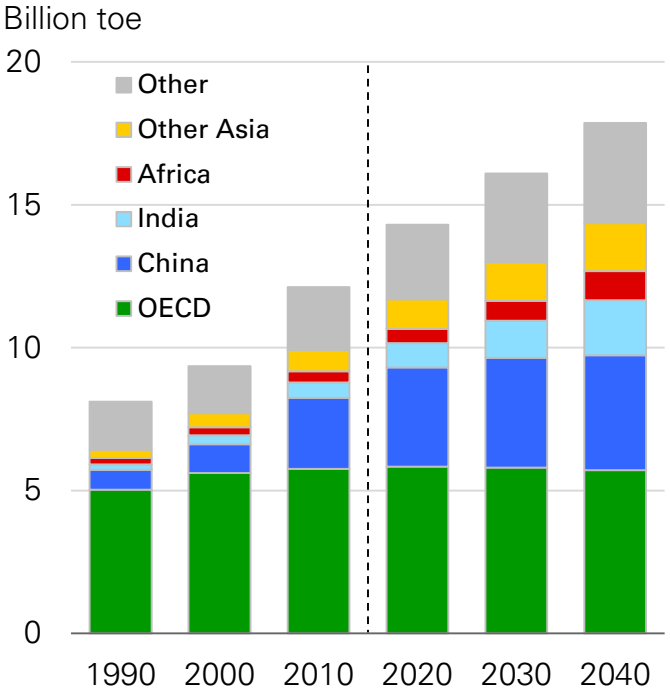
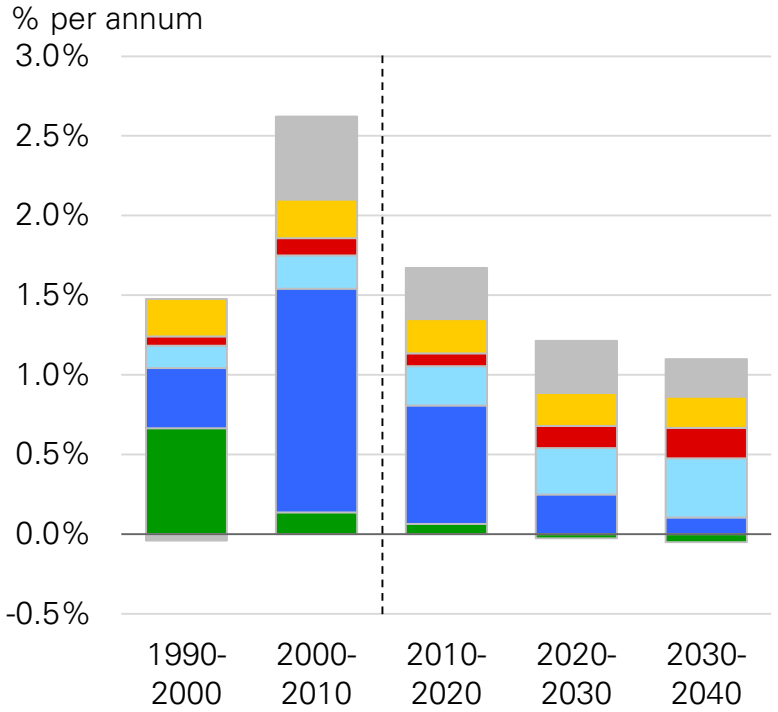
Regional energy demand

Primary energy consumption by region



Primary energy growth and regional contributions



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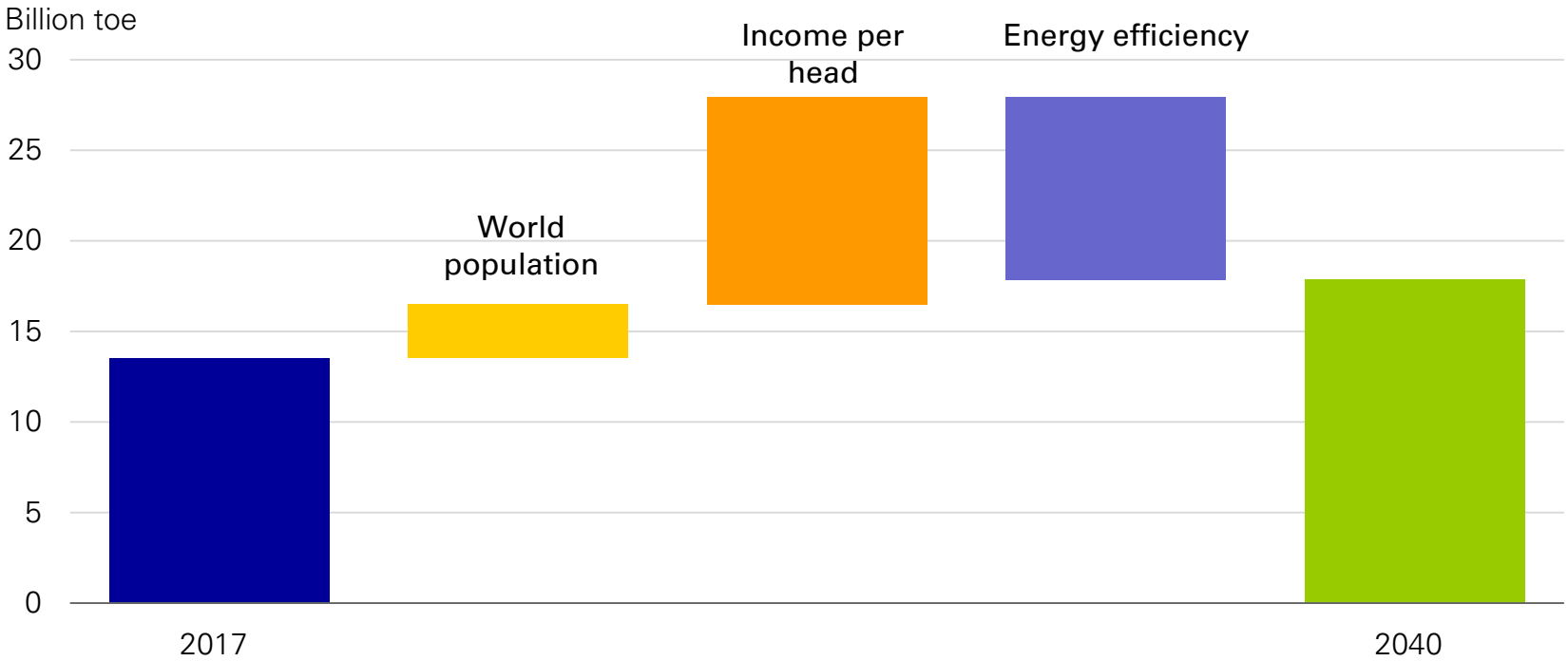
Increase in primary energy demand

Increase in primary energy demand, 2017-2040



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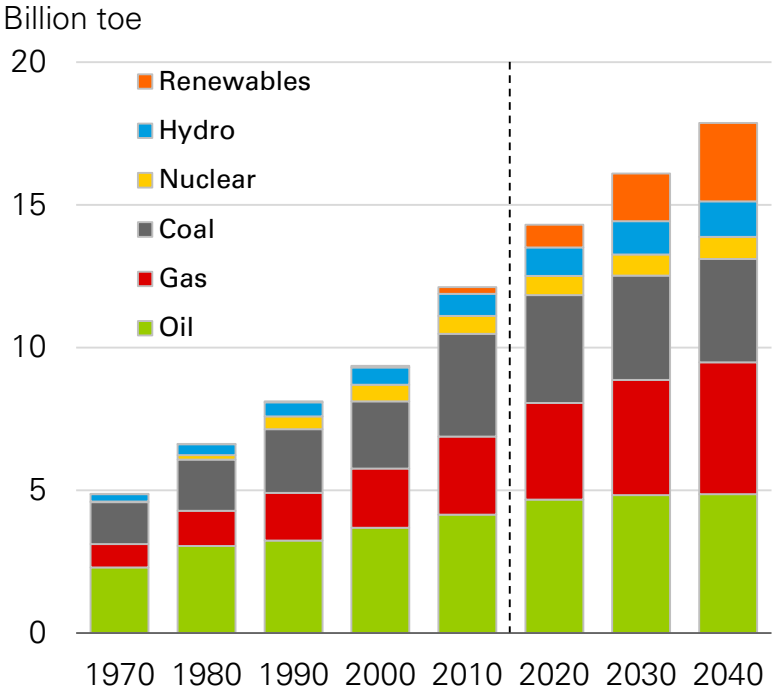
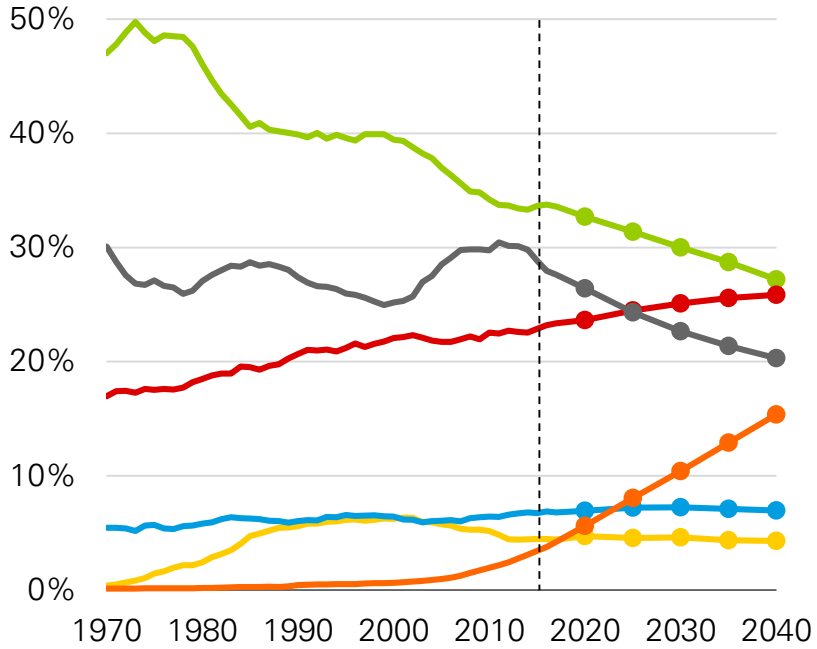
Global energy by fuel type

Primary energy consumption by fuel



Shares of primary energy



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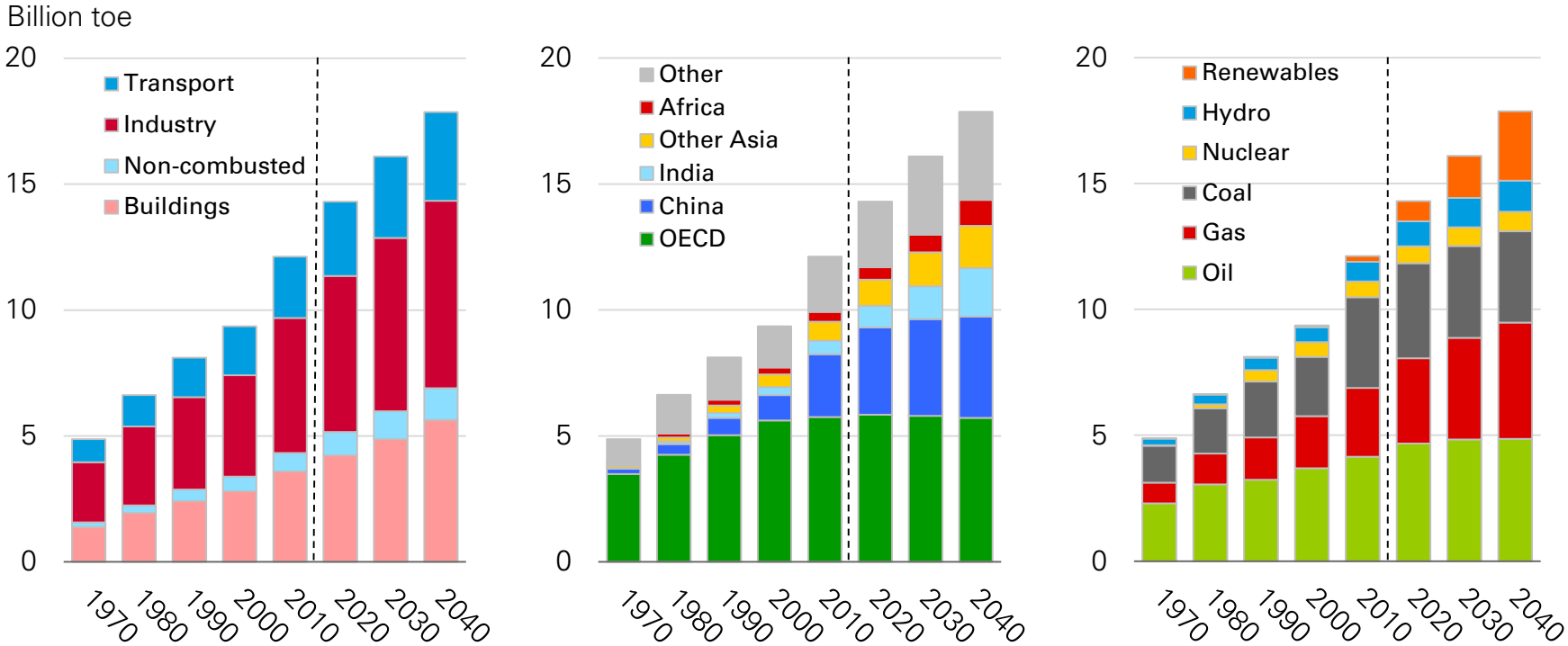

2019 BP Energy Outlook

Five key questions and uncertainties

- How much ‘more energy’ does the world need?
- How important are plastics for the future of oil demand?
- What might happen if the trade disputes escalate?
- How quickly could renewables grow?
- A low-carbon energy system: what more needs to be done?

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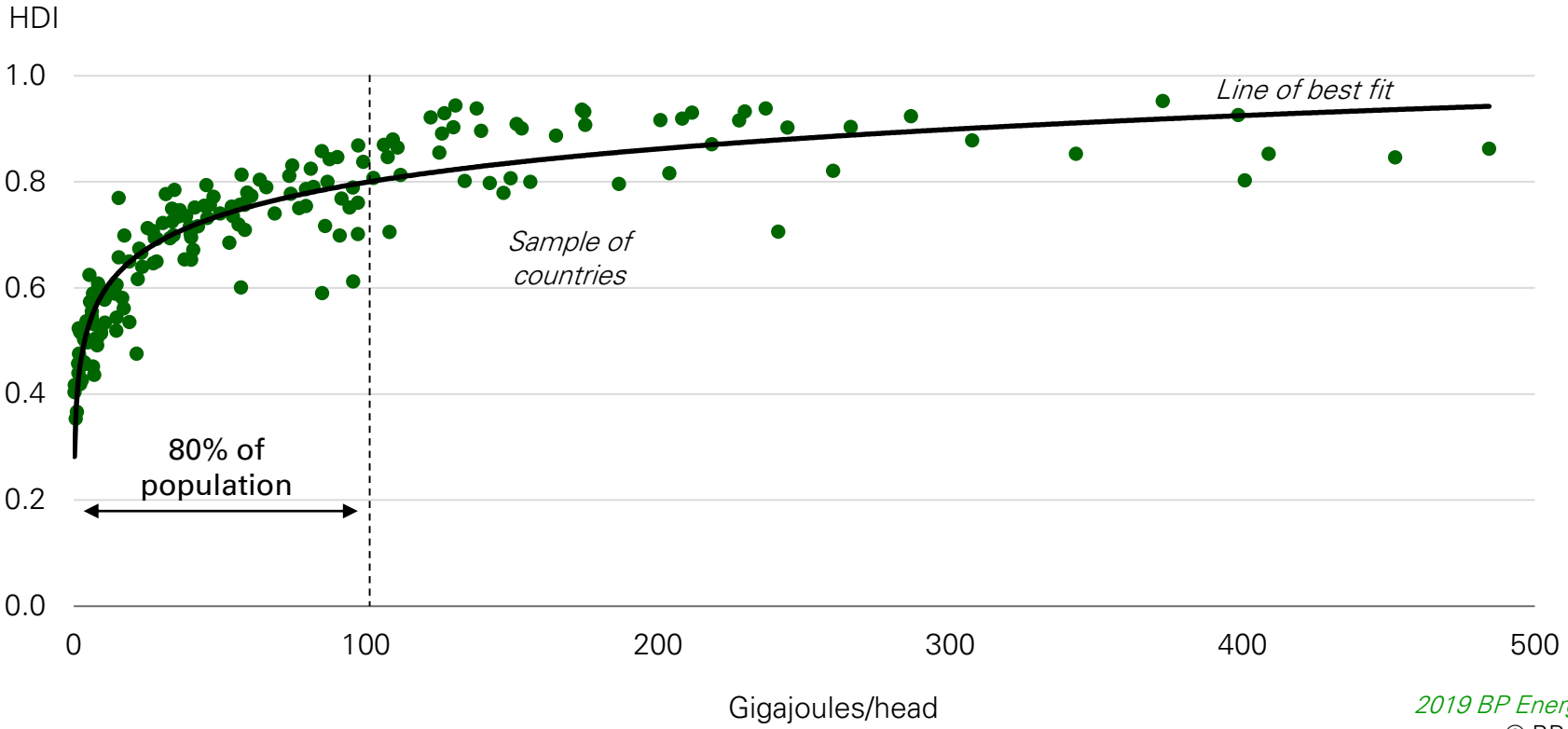
Human development and energy consumption

UN Human Development Index and energy consumption, 2017



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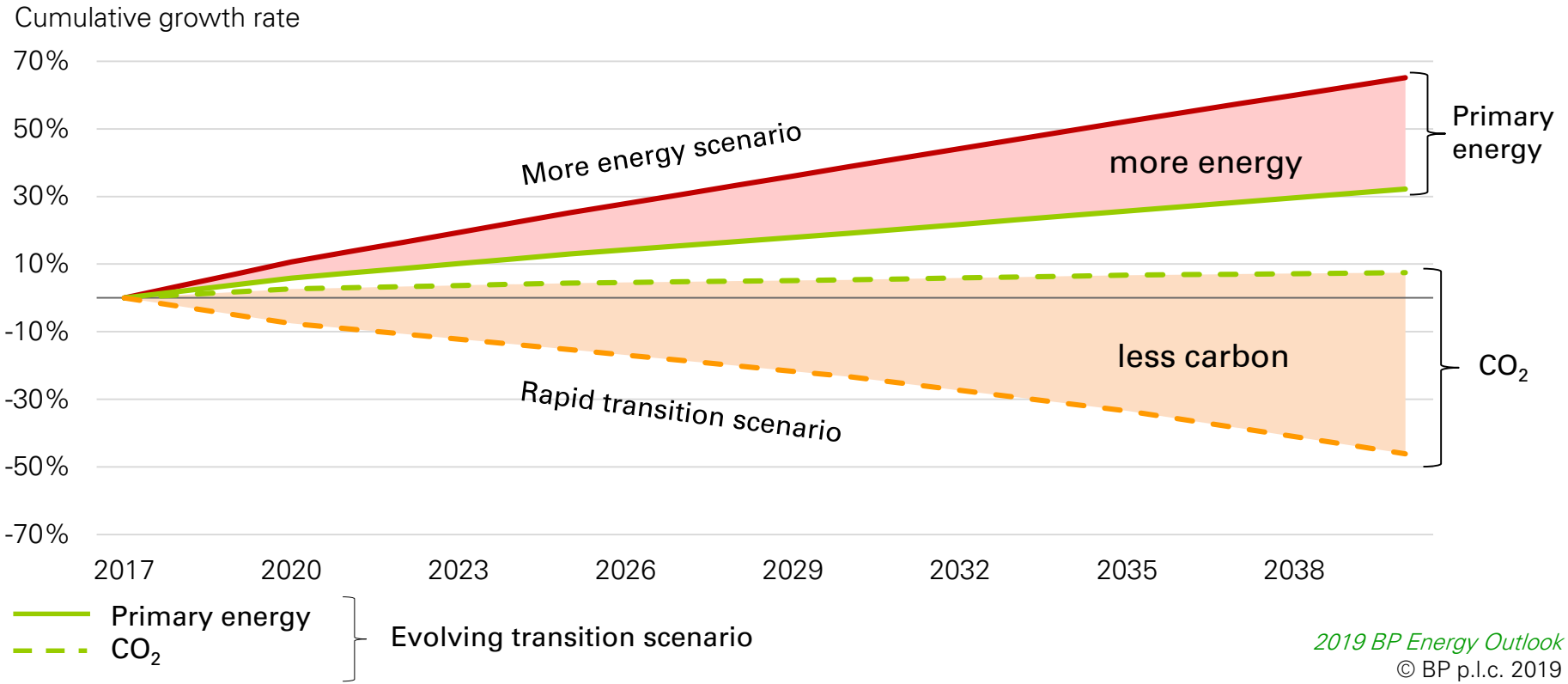
Dual challenge: more energy, less carbon

Primary energy demand and carbon emissions



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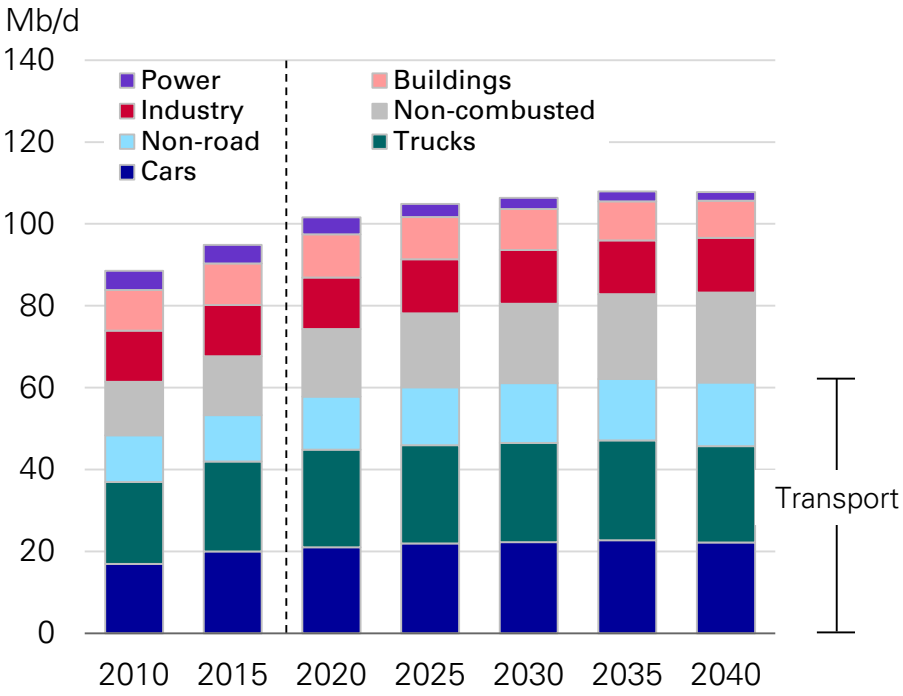
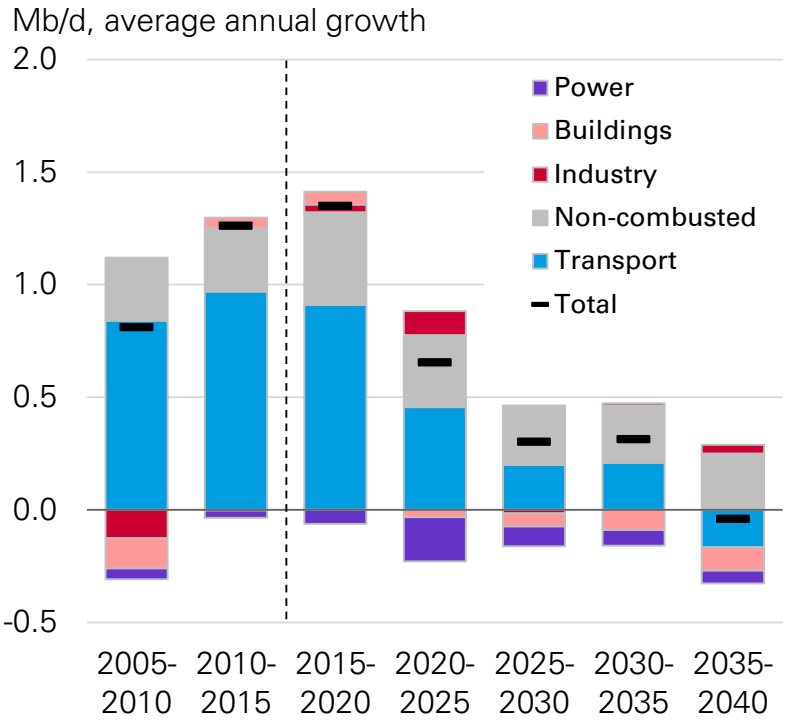
Demand for oil and other liquid fuels

Liquids demand



Liquids demand growth



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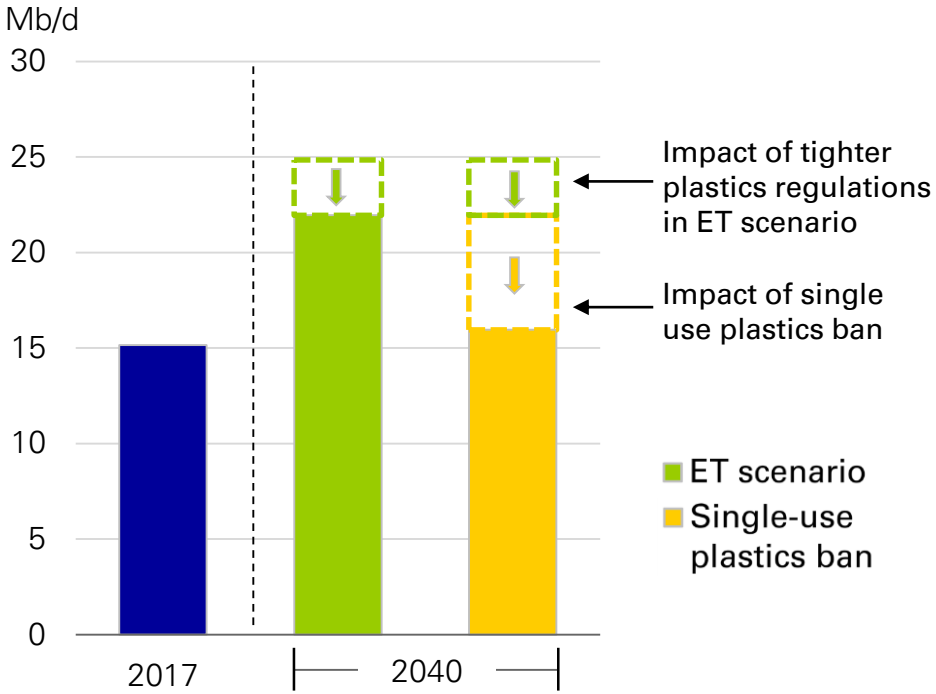
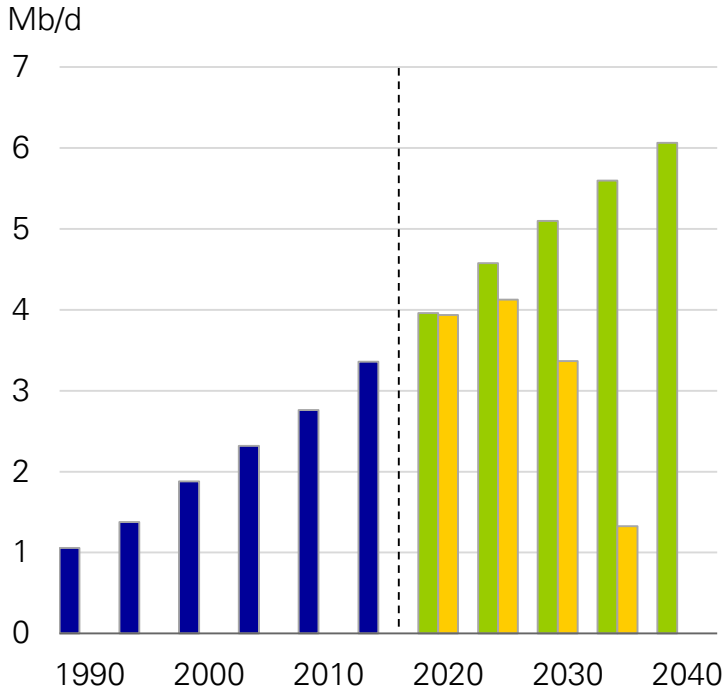
Demand for liquid fuels and plastics

Demand for non-combusted liquid fuels



Liquid feedstocks for single-use plastics



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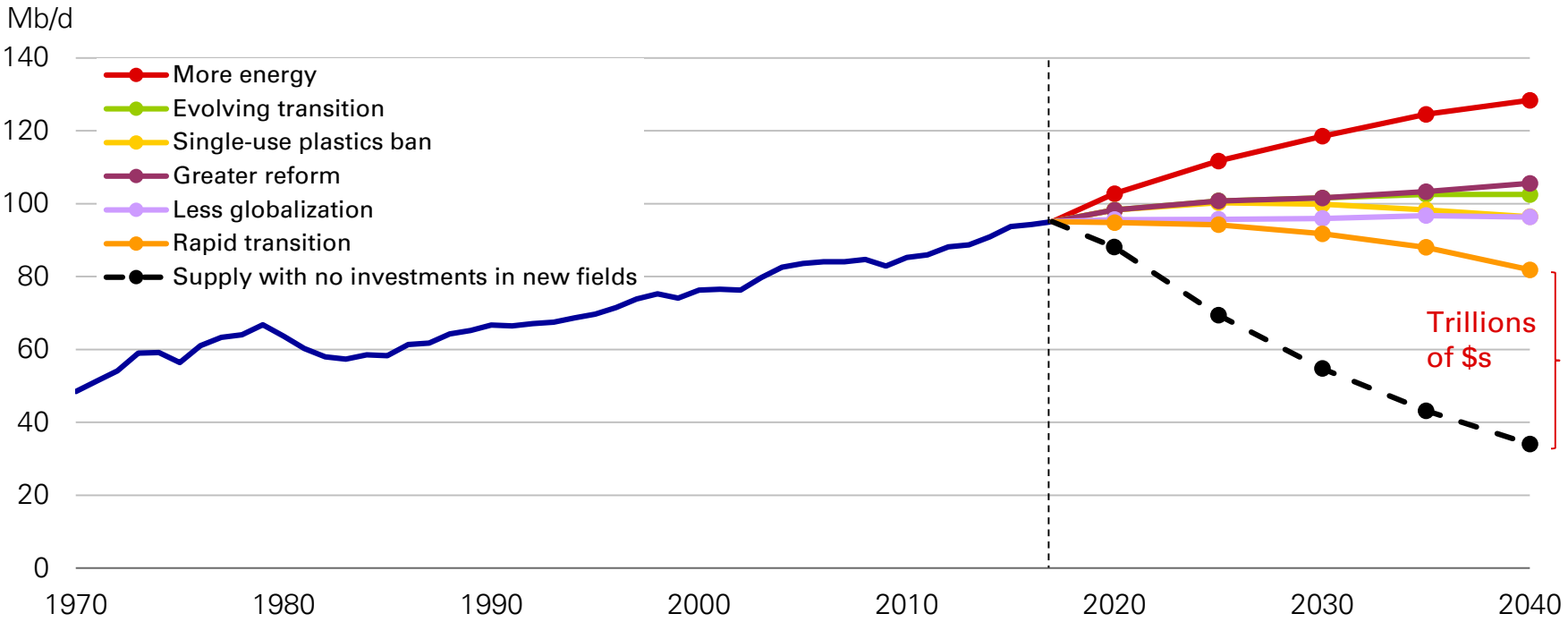
Demand and supply of oil



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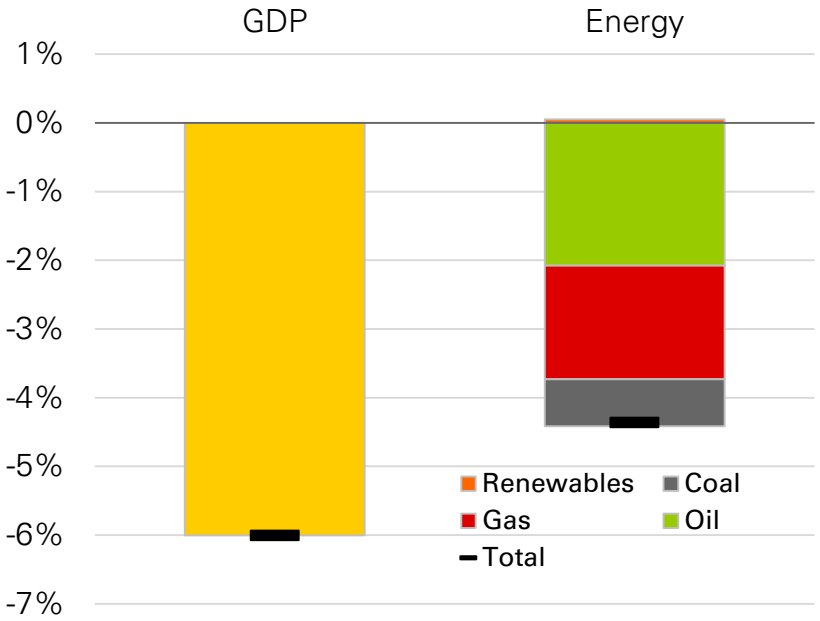
Less globalization scenario

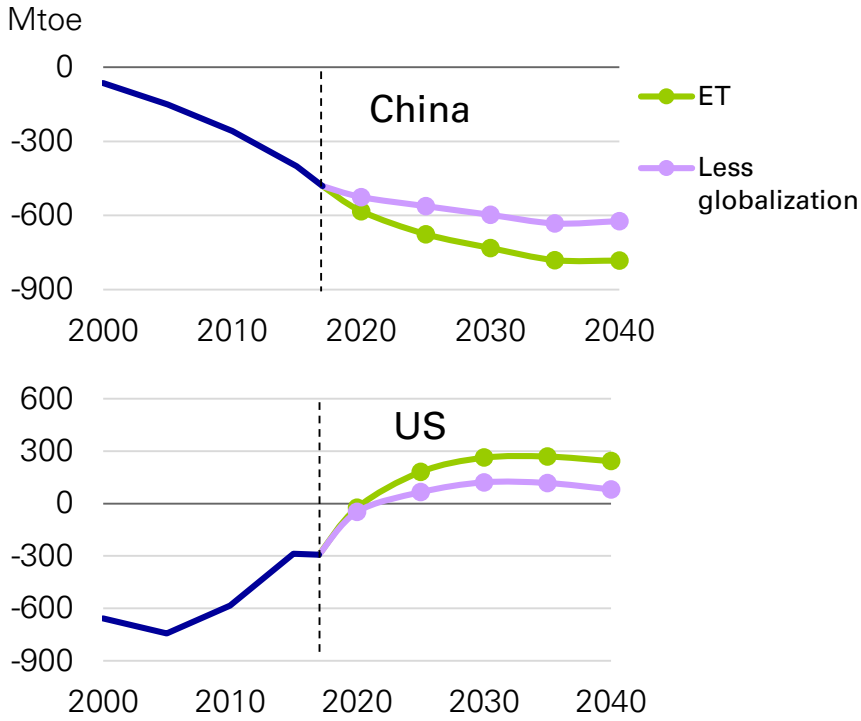
- Reduced openness and trade leads to slight reduction in trend global GDP growth
- Concerns about energy security adds a small risk premium (10%) to imported energy

Alternative scenario: Less globalization

Difference relative to ET scenario in 2040:
Global GDP and energy



Net exports (oil & gas)



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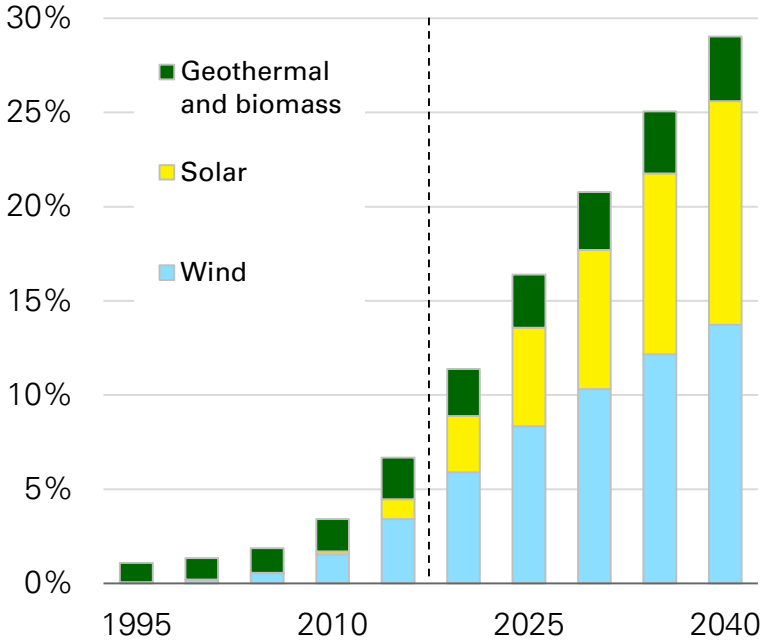
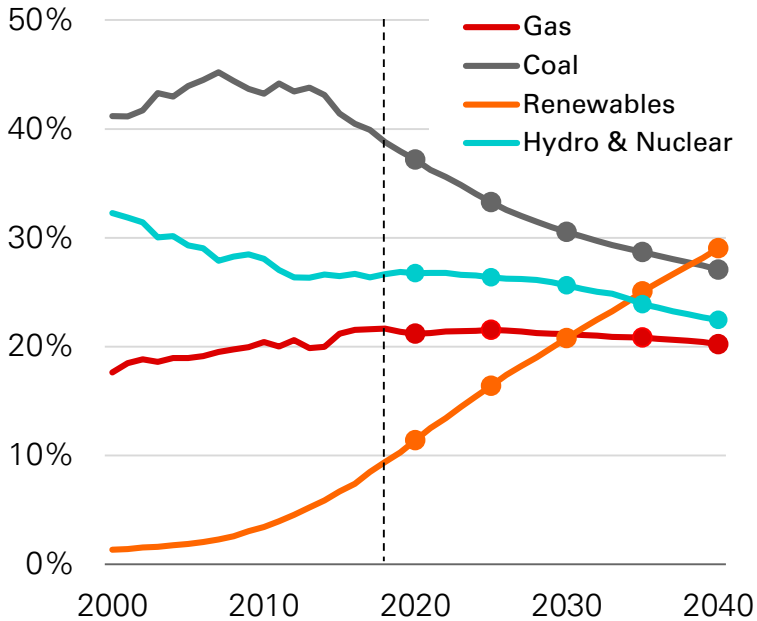
Renewable energy

Renewables share of power generation



Fuel shares in power



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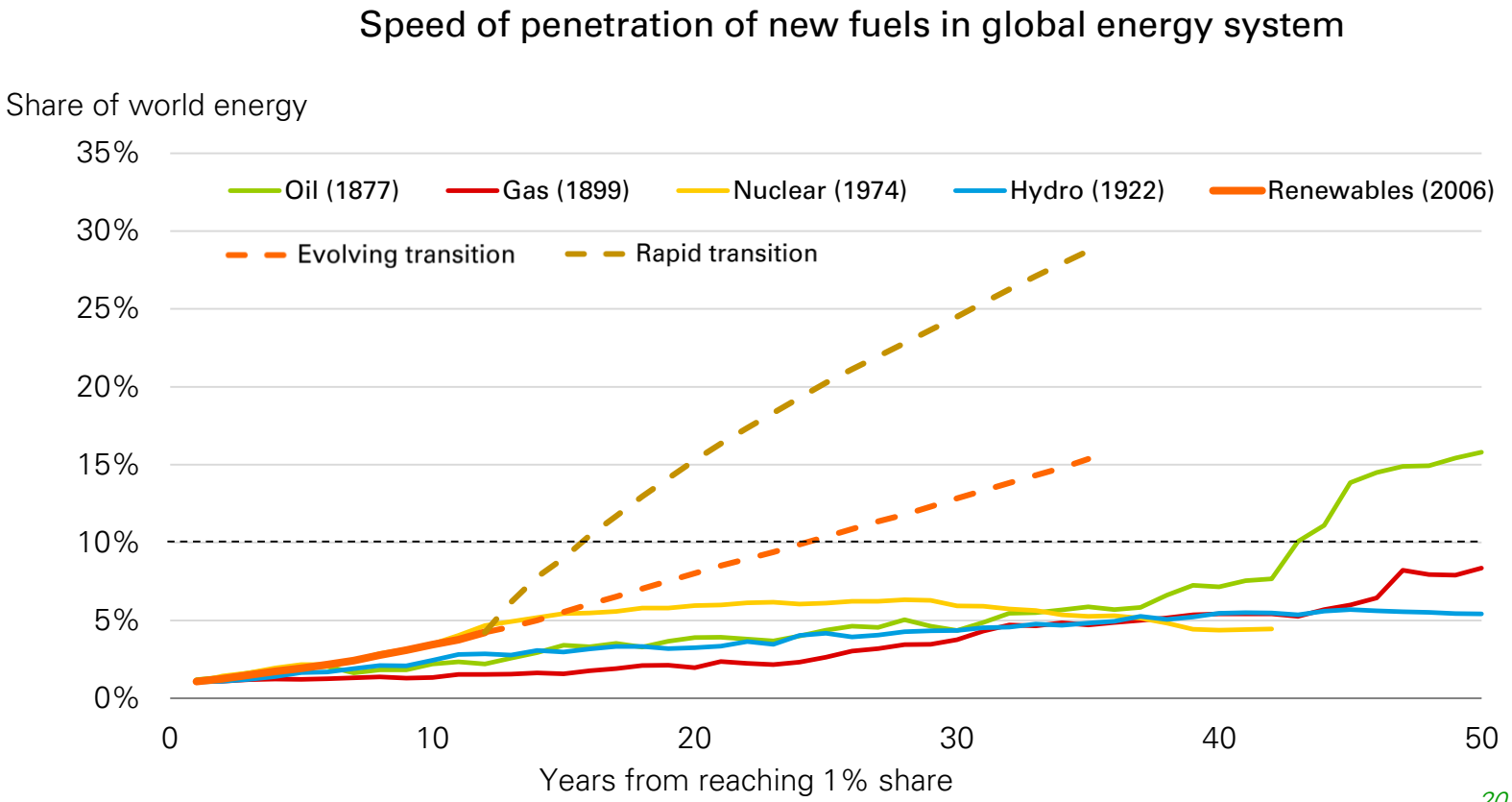
Speed of energy transition



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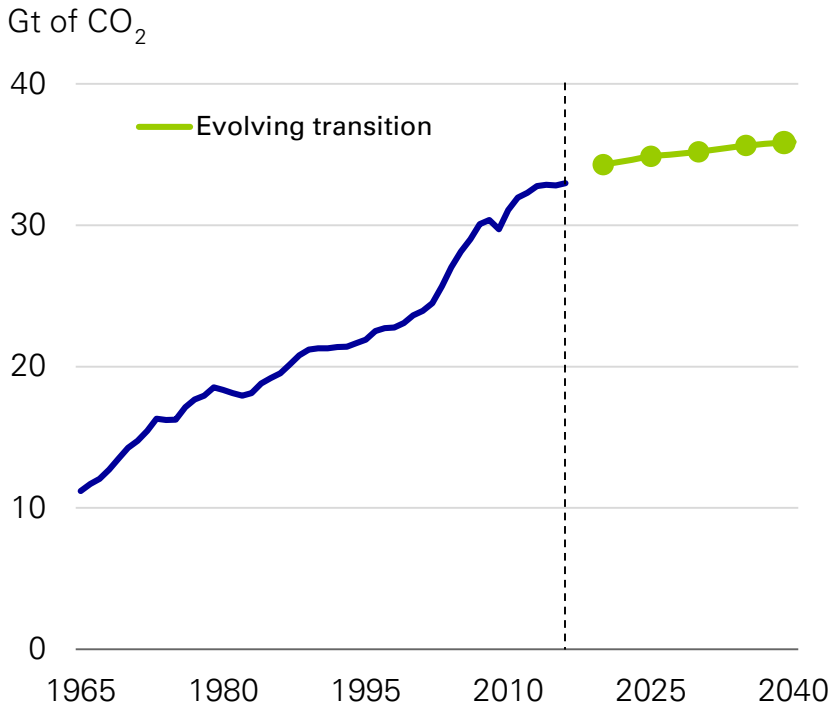
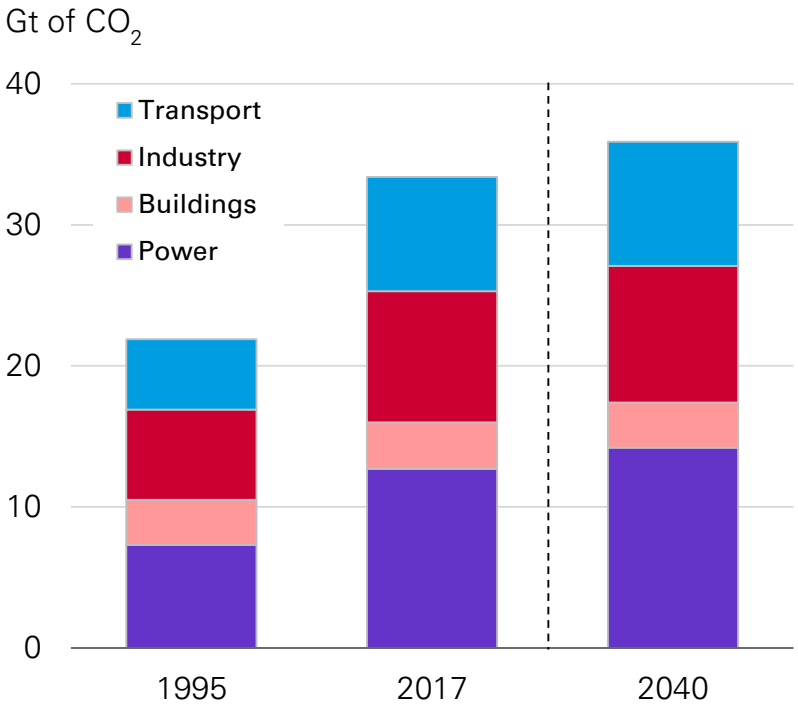
CO_2 emissions in ET scenario

CO_2 emissions



CO_2 emissions by sector



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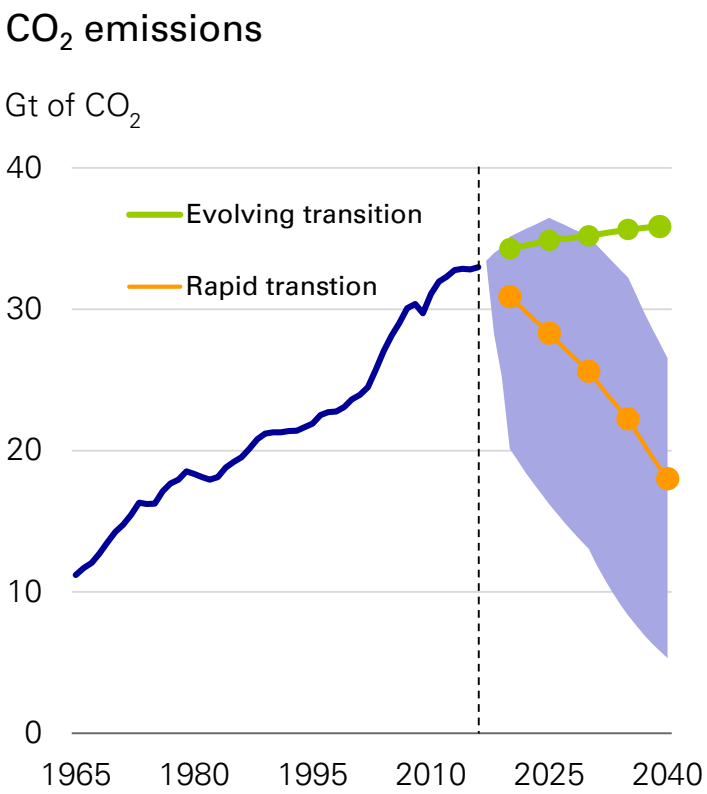
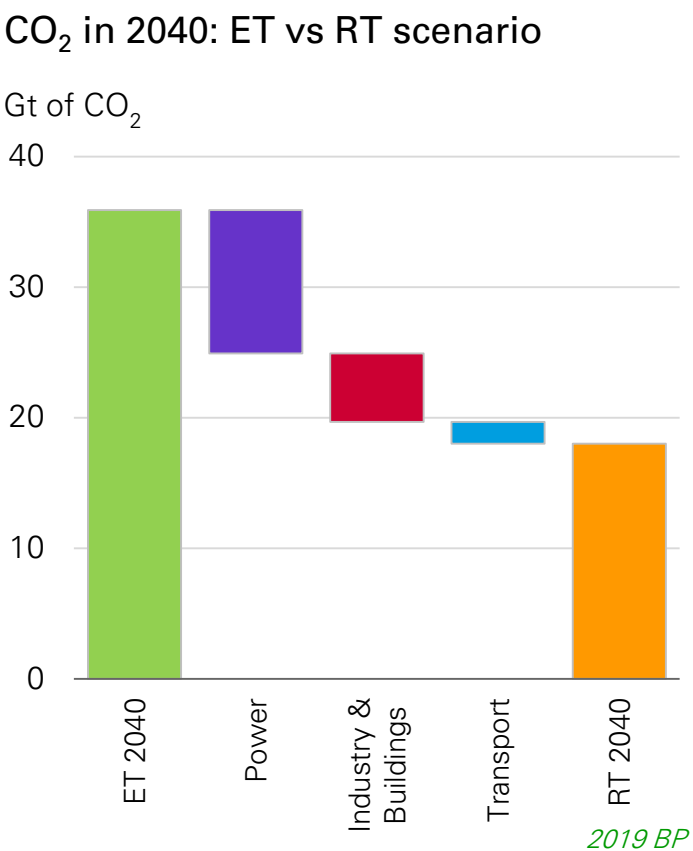
Rapid transition scenario: policy measures

- Wide range of policy measures: broadly equivalent in terms of their implied costs and effort
- No silver bullet: a comprehensive set of policy measures is needed
- Carbon prices are key, especially in the power and industrial sectors
- Role for targeted regulatory measures, especially until carbon prices reach material levels

CO_2 emissions





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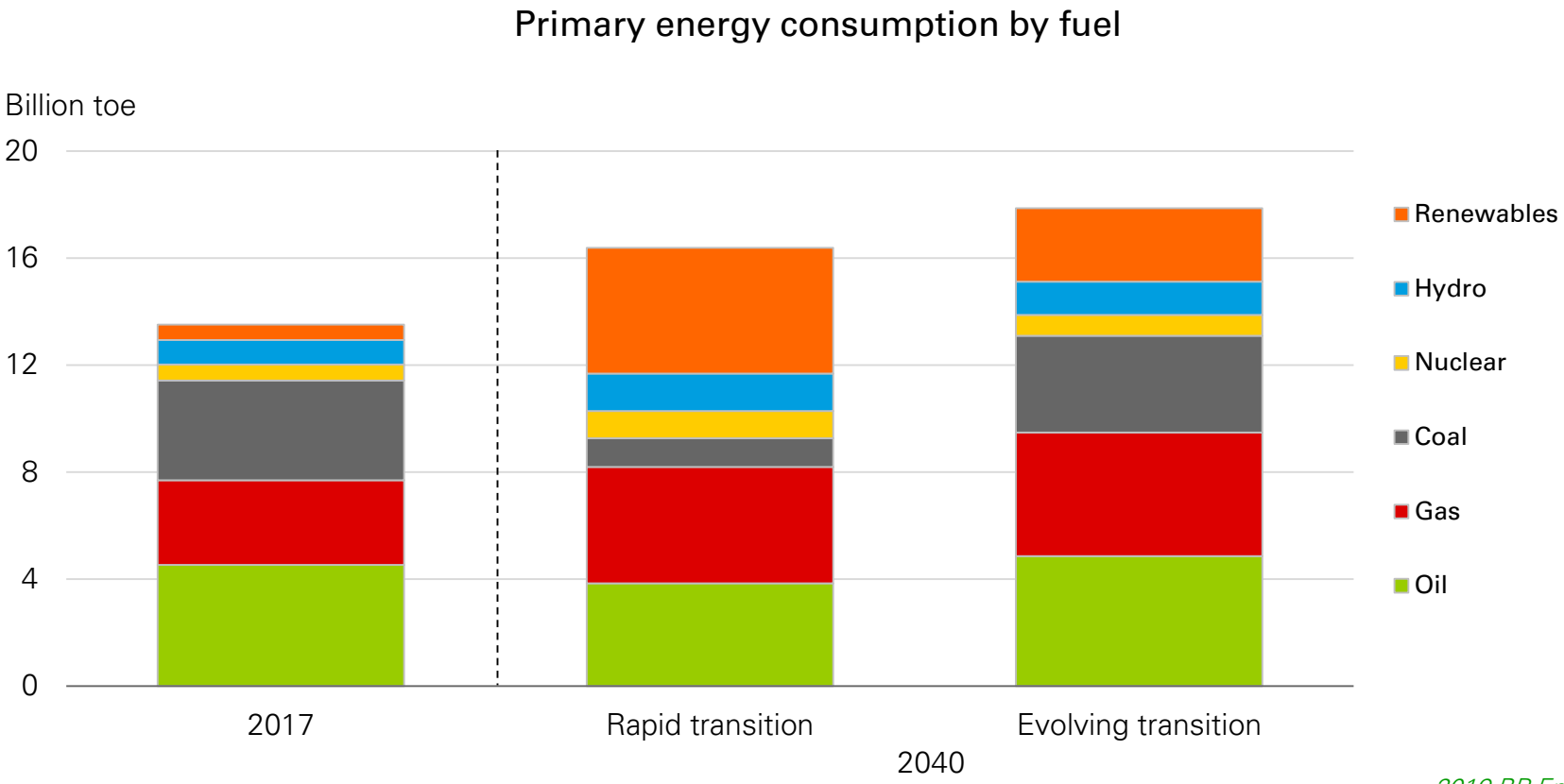
Global energy demand and fuel mix



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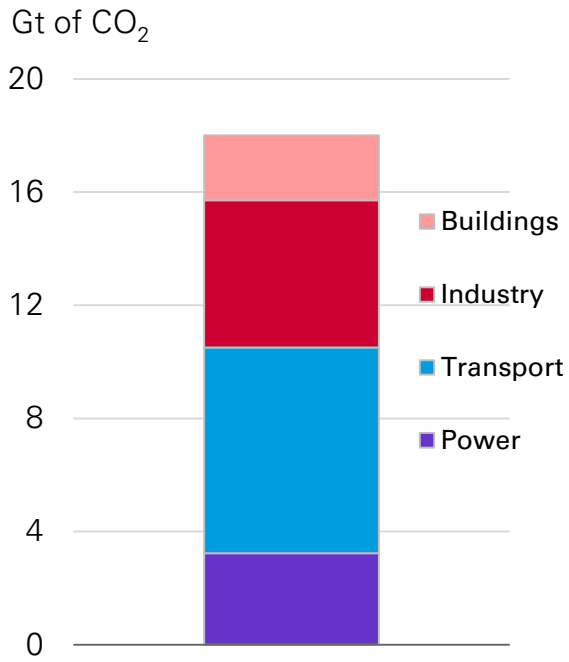
Hard-to-abate carbon emissions

CO_2 emissions in RT scenario in 2040



Decarbonise power sector
- Renewables
- Gas (and coal) plus CCUS
- Energy storage and demand-side-response

Other low-carbon energy sources and carriers
- Hydrogen
- Bioenergy

Efficiency
- Circular economy
- Process efficiency

Storage and removal of carbon
- CCUS
- Negative emission technologies, eg land carbon, bioenergy with CCS (BECCS)

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