Trends in Energy Scenario Development

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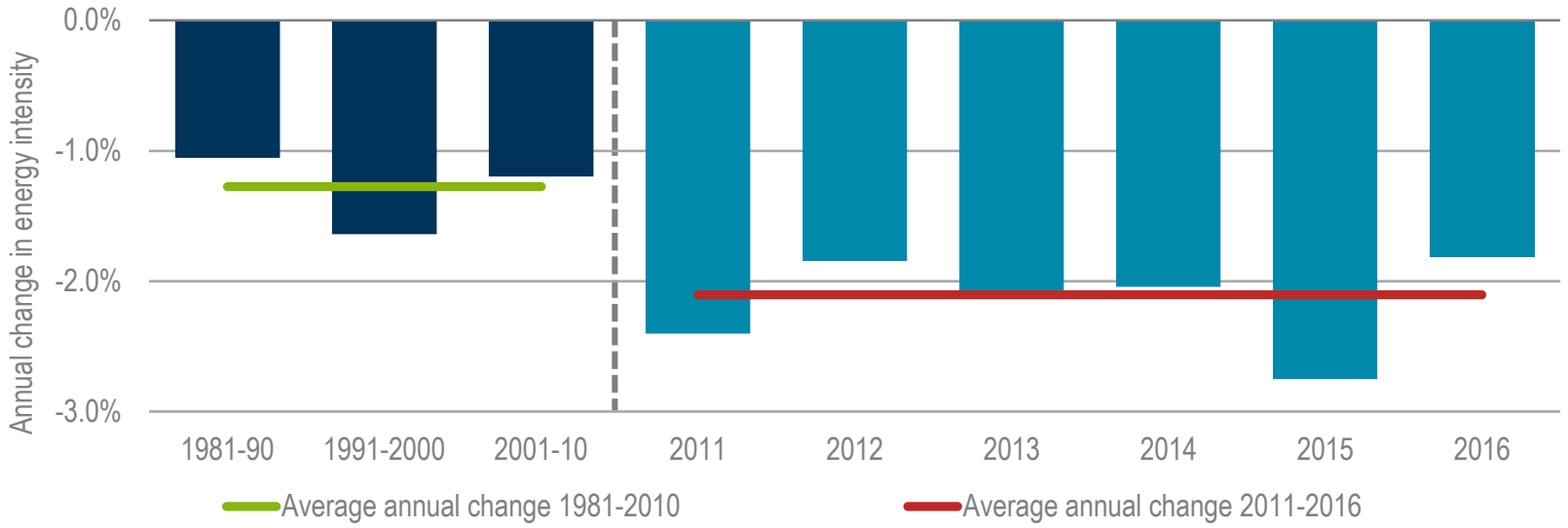
IEA

Context

- **Energy Efficiency:** The world is generating more value than ever from its energy use, and there has been a noticeable acceleration in recent years
- **Renewables:** Solar PV broke new records in 2016, led by China and is on track to be the cheapest source of new electricity in many countries
- **China:** Drive to "make the skies blue again" is recasting its role in energy
- **United States:** Is turning into the undisputed global leader in oil and gas
- **Electrification**: The future is electrifying, spurred by cooling, electric vehicles & digitalisation
- There are many possible pathways ahead & many potential pitfalls if governments or industry misread the signs of change

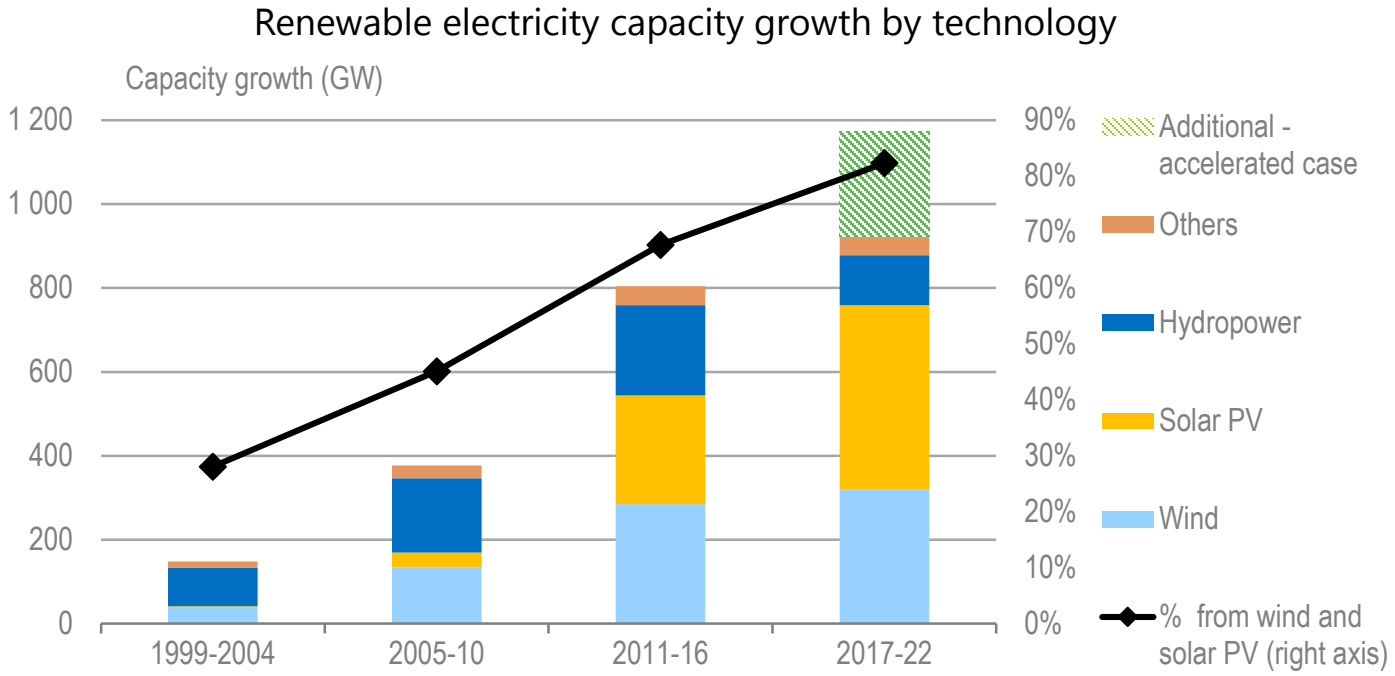
The world is generating more value from its energy use

Changes in global energy intensity (energy per unit of GDP)



This decade has seen intensity improvement rates at almost double the historic average, suggesting that the world has entered a new era of faster intensity gains.

Renewables growth more and more dependent on wind and solar

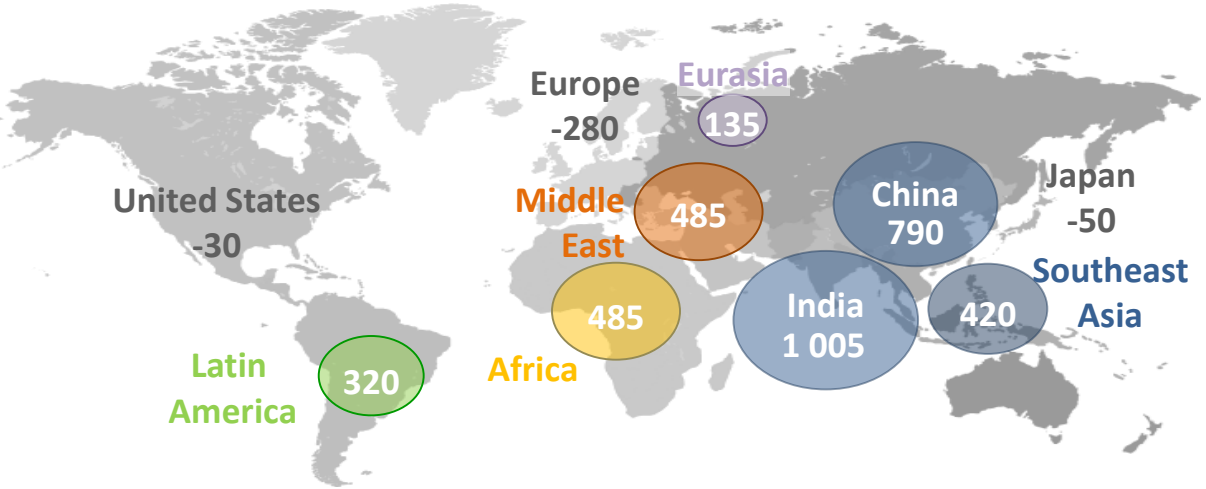


Solar PV enters a new era, becoming the undisputed leader in renewable power capacity growth; PV also accounts for 60% of the upside potential in the accelerated case

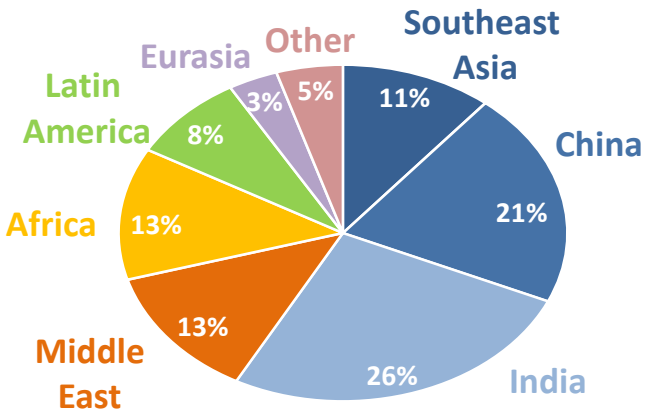
A shift in the global centre of gravity for energy

Southeast Asia Energy Outlook 2017

Change in primary energy demand to 2040 (Mtoe)

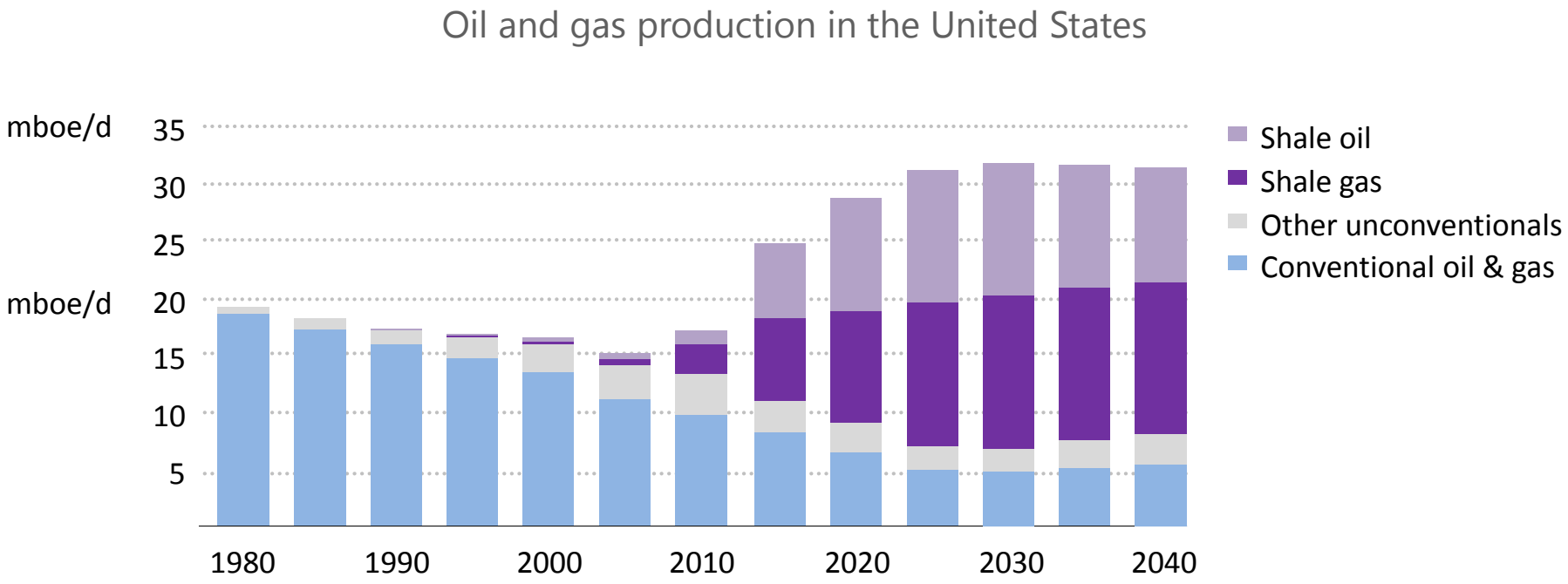


Share of global growth 2016-2040



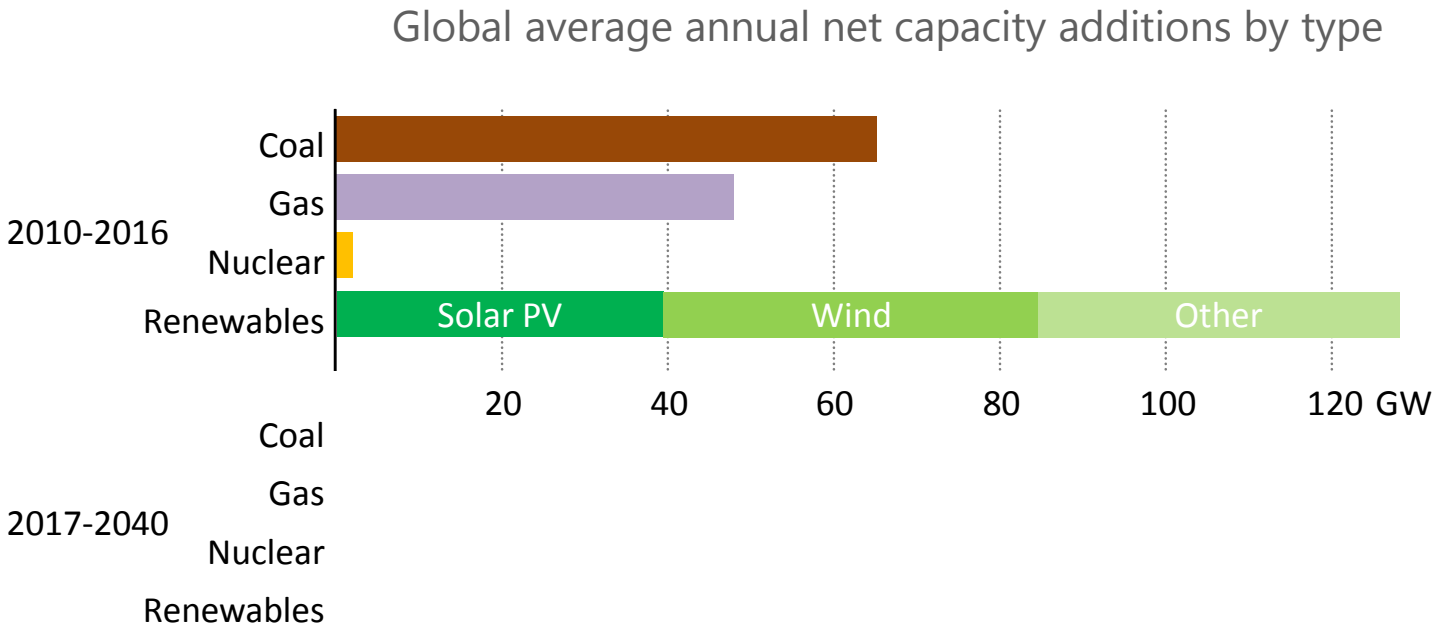
Southeast Asia, India and China are the engine of future energy demand growth, together accounting for almost 60% of the global increase to 2040

US becomes undisputed leader of oil & gas production



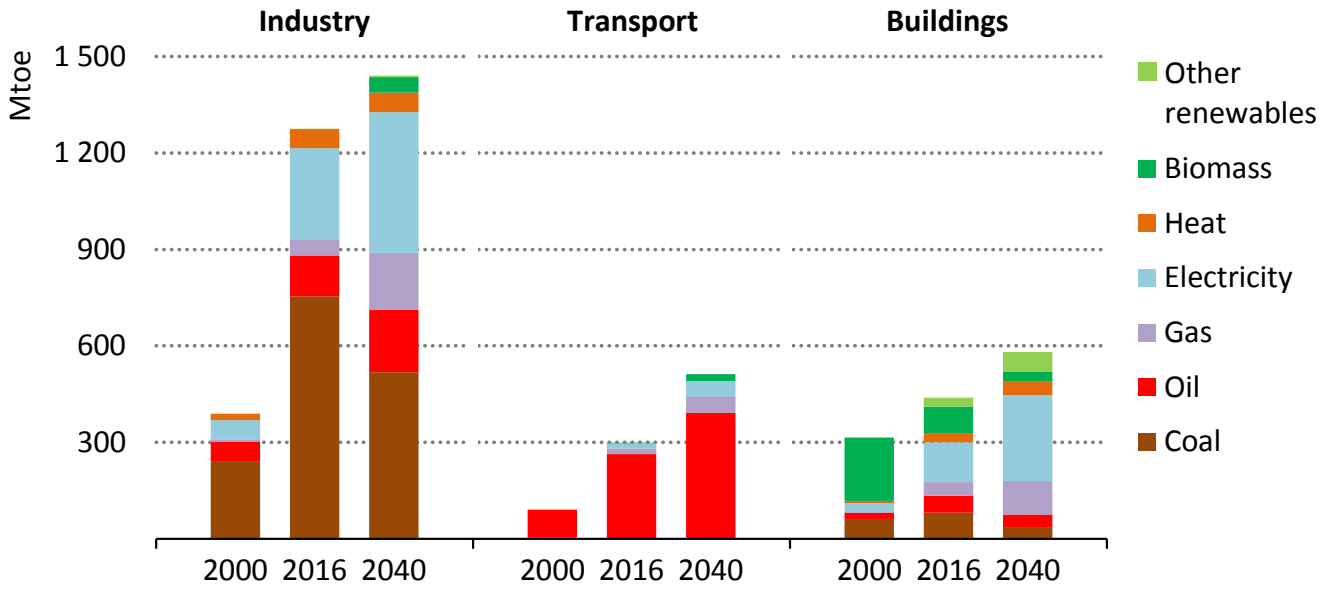
The US is already switching to become a net exporter of gas & becomes a net exporter of oil in the 2020s, helped also by the demand-side impact of fuel efficiency & fuel switching

Solar PV forges ahead in the global power mix



China, India & the US lead the charge for solar PV, while Europe is a frontrunner for onshore & offshore wind: rising shares of solar & wind require more flexibility to match power demand & supply

Energy demand by fuel in selected end-use sectors in China in the New Policies Scenario

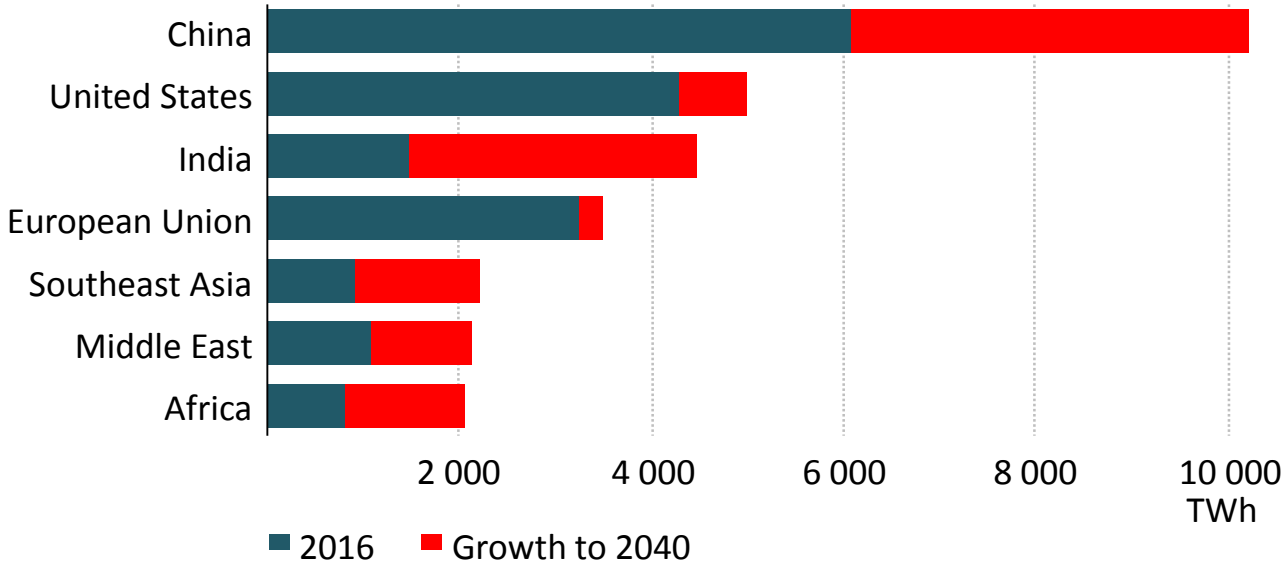


As China enters the next phase of development, the focus shifts from industry-led towards services-led growth with a focus on energy efficiency and electricity use

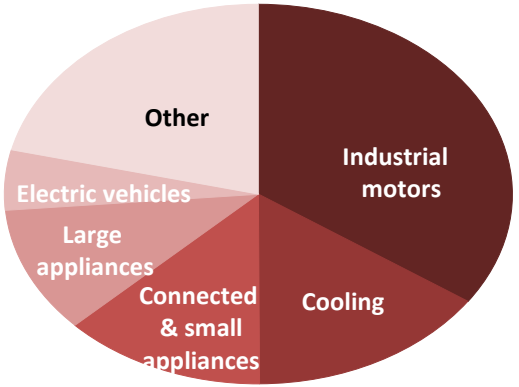
The future is electrifying

World Energy Outlook 2017

Electricity generation by selected region

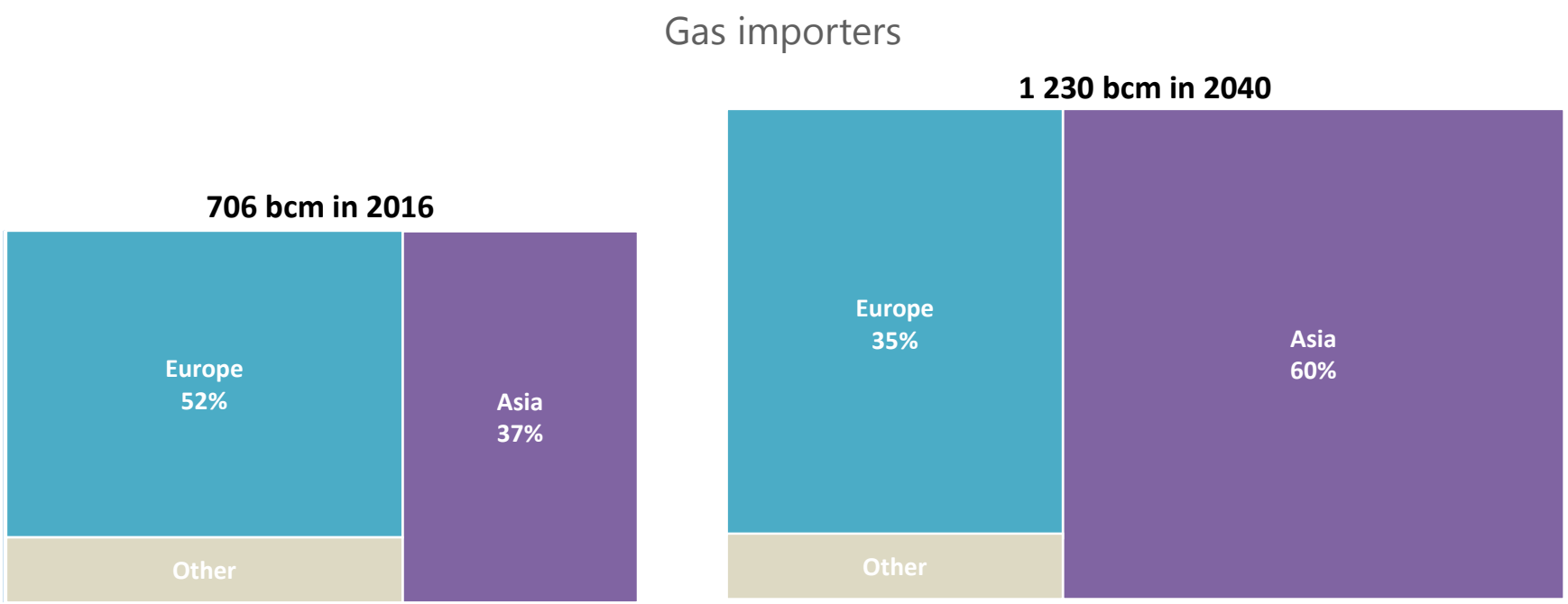


Sources of global electricity demand growth



China adds the equivalent of today's United States to its electricity generation by 2040 and Southeast Asia becomes the 5th largest electricity consumer

LNG ushers in a new global gas order



Growing gas import requirements in developing Asia, Japan and Korea are largely met by LNG, with exports from the US accelerating a shift towards a more flexible, liquid global market

Conclusions

- While energy efficiency has improved in recent years, 68% of global energy use remains uncovered by mandatory policy and low rate of policy implementation needs to accelerate.
- Prospects for renewables driven by developments in solar PV and wind requiring greater focus on systems integration
- China continues to shape global trends, but in new ways as its "energy revolution" drives cost reductions for a wide range of clean energy technologies that can benefit APEC
- Electrification & digitalisation are the future for many parts of the global energy system, creating new opportunities

Suggestions for future APERC scenarios

- Accelerated energy efficiency scenario assuming efficient urban design and optimised heating and cooling networks
- High electrification scenario to identify opportunities for decarbonising end uses with low cost renewables and shifting away from fossil fuels
- Energy scenarios under a Sustainable Development Goal lens; IEA's Sustainable Development Scenario covers SDG 3 (Clean Air), 7 (Access and Renewables) and 13 (Climate Change)

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