The rapidly changing global energy landscape

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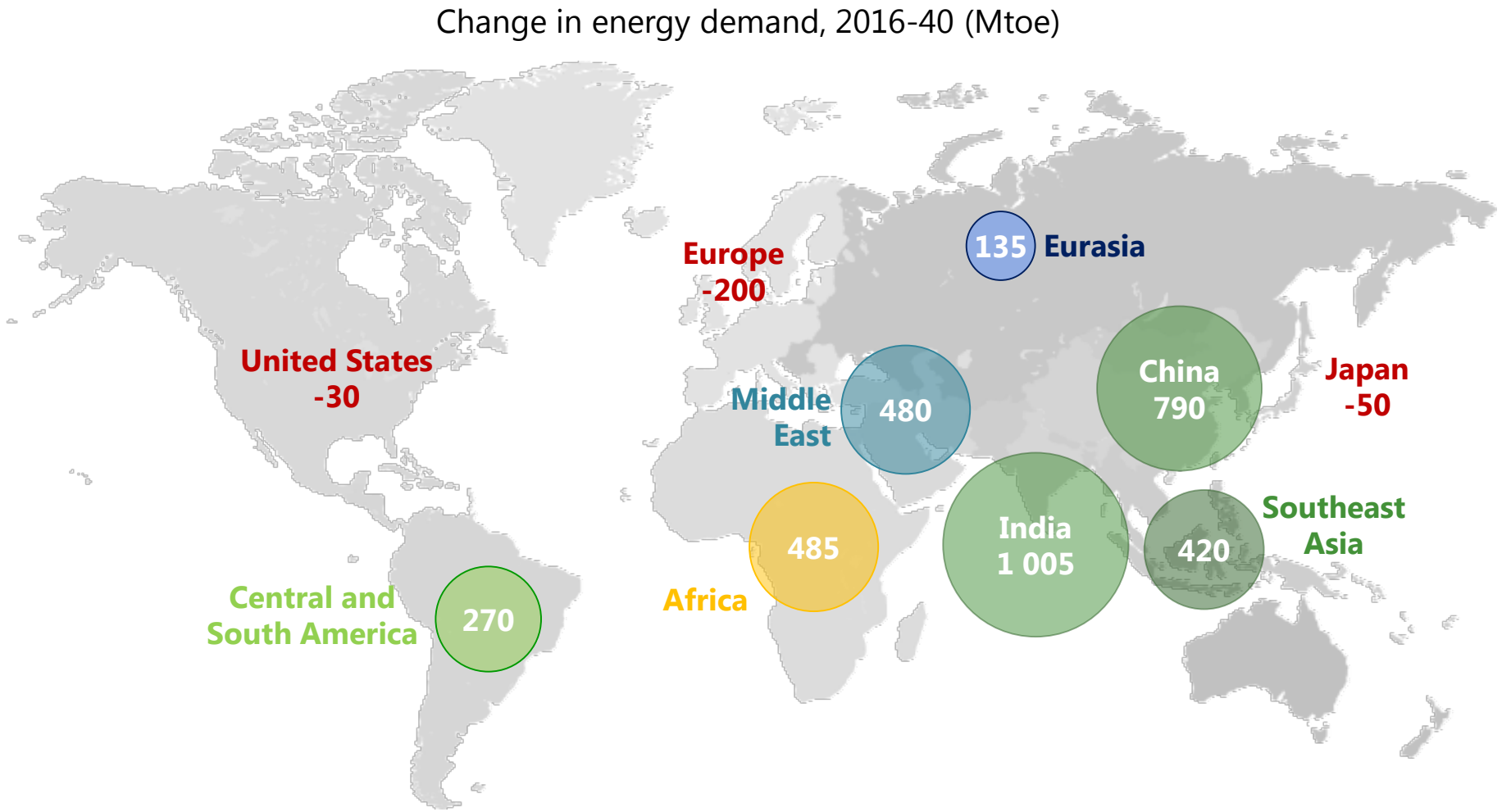
IEA

Tipping the energy world off its axis

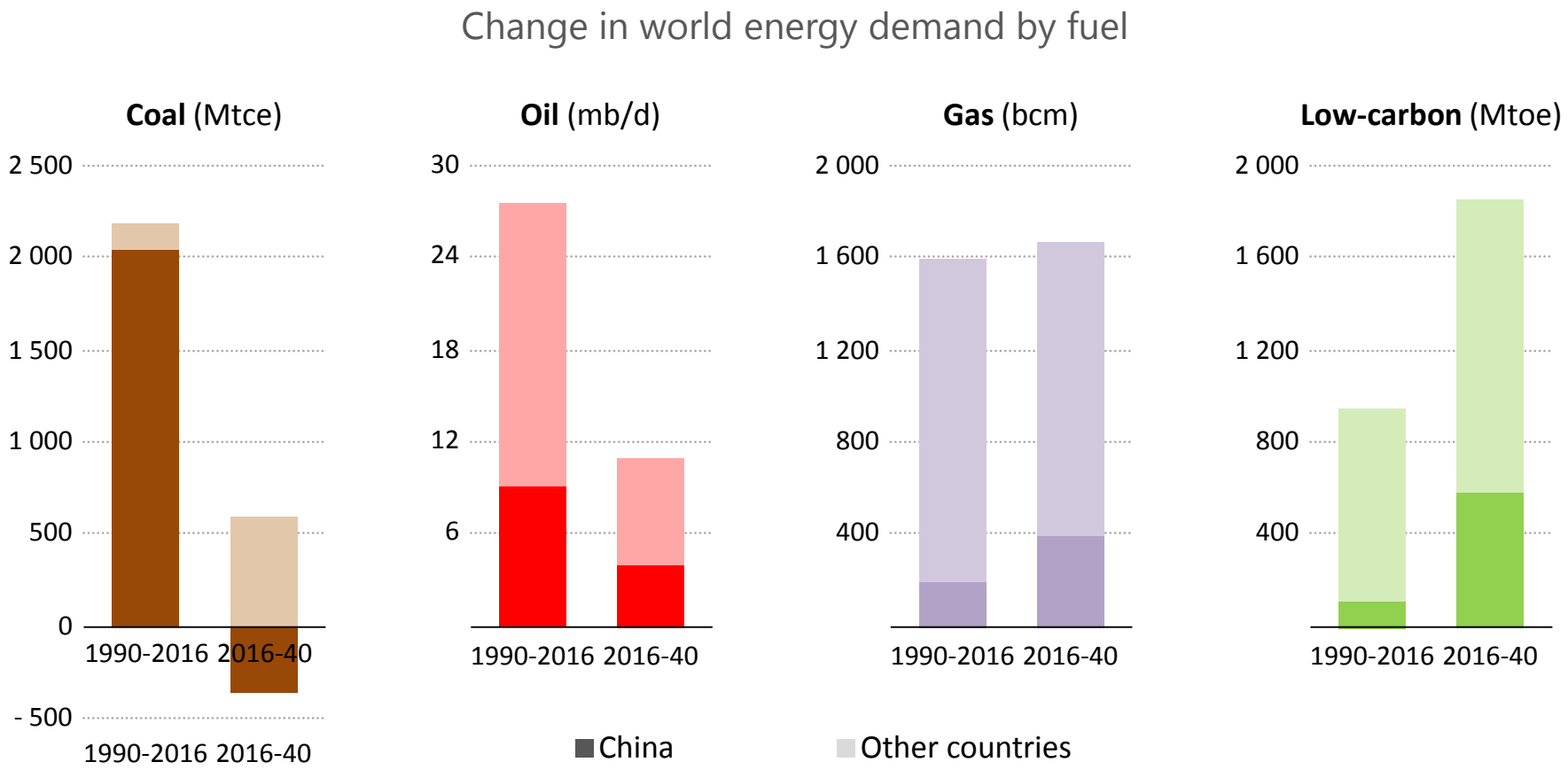
- Four large-scale upheavals in global energy :
  - *The United States is turning into the undisputed global leader for oil & gas*
  - *Solar PV is on track to be the cheapest source of new electricity in many countries*
  - *China's new drive to "make the skies blue again" is recasting its role in energy*
  - *The future is electrifying, spurred by cooling, electric vehicles & digitalisation*
- These changes brighten the prospects for affordable, sustainable energy & require a reappraisal of approaches to energy security
- There are many possible pathways ahead & many potential pitfalls if governments or industry misread the signs of change

India takes the lead, as China energy growth slows



India, China and other developing Asia will be critical in determining the future trajectory of global energy demand & C02 emissions

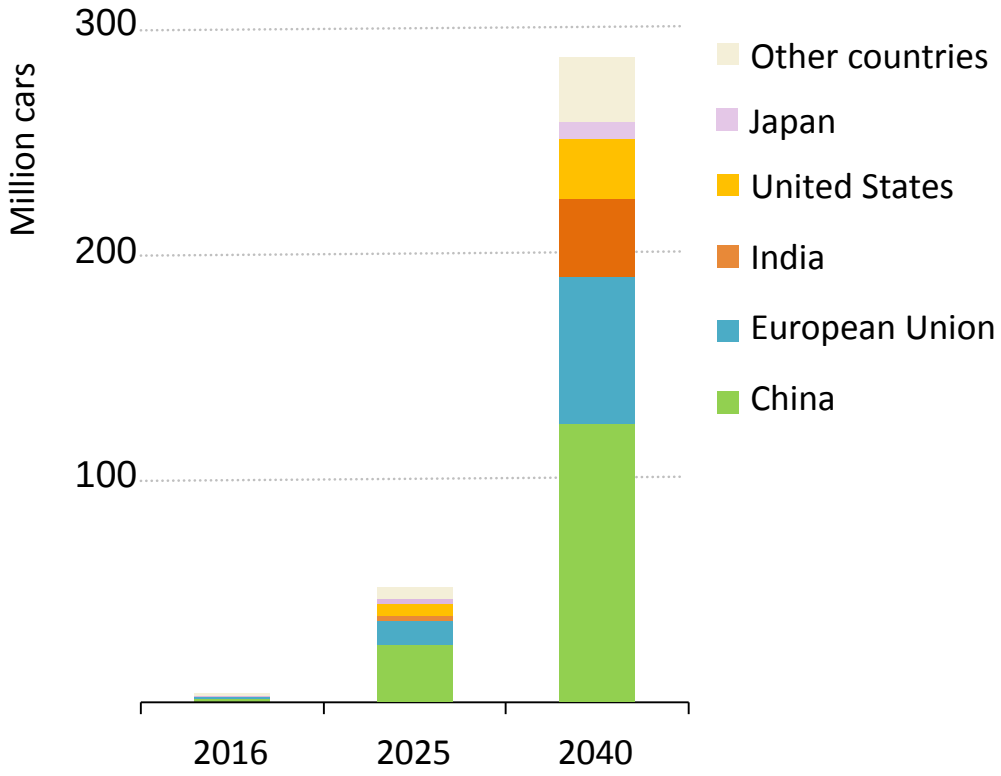
..A world in motion..as China moves global energy markets, again



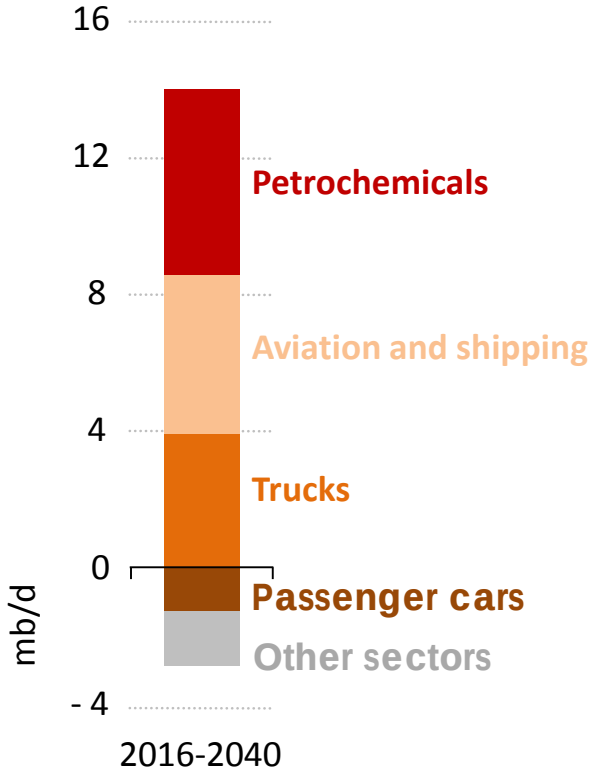
Low-carbon sources & natural gas meet 85% of the increase in global demand:
China's switch to a new economic model & a cleaner energy mix drives global trends

EVs are on the way, but oil demand still keeps rising

Electric car fleet

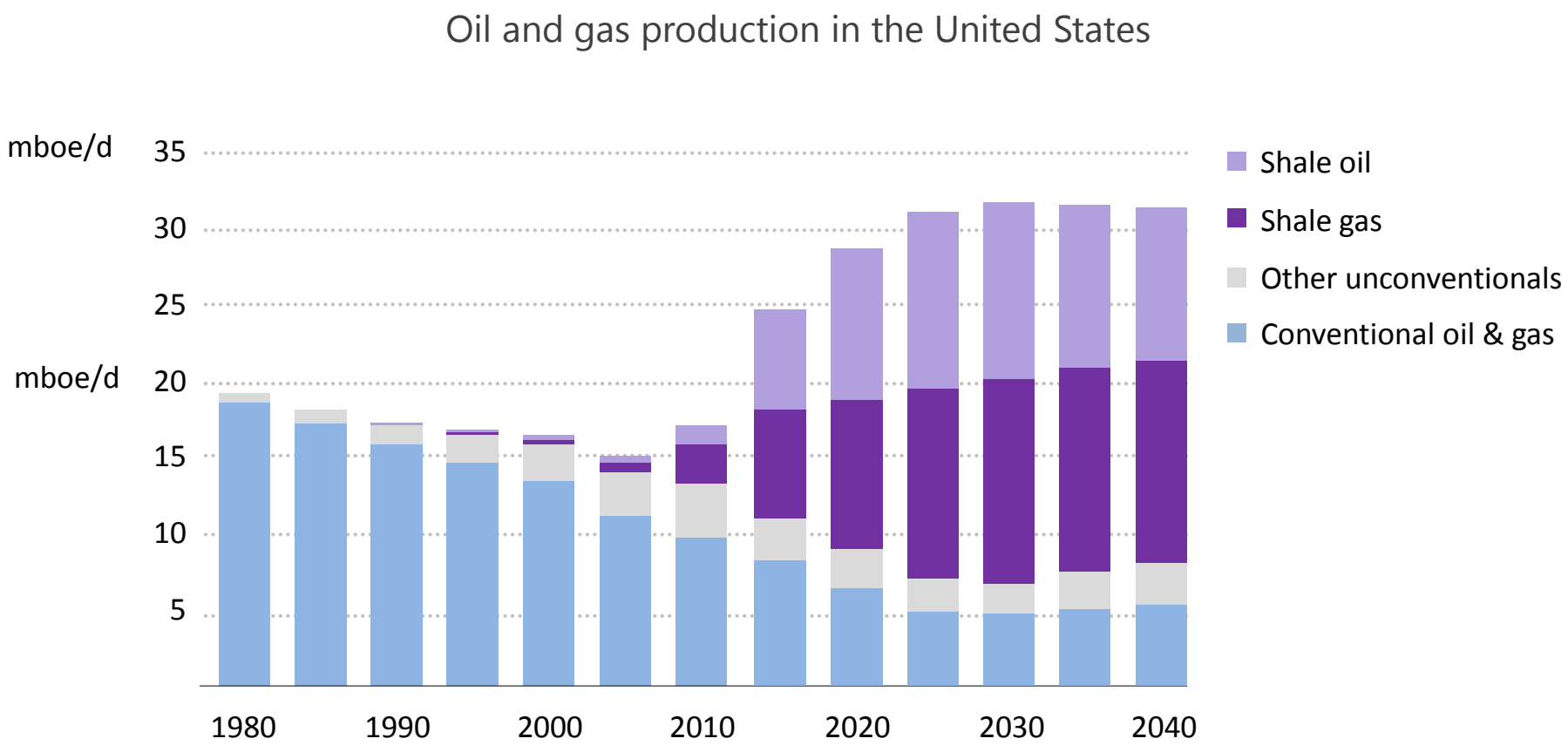


Change in global oil demand



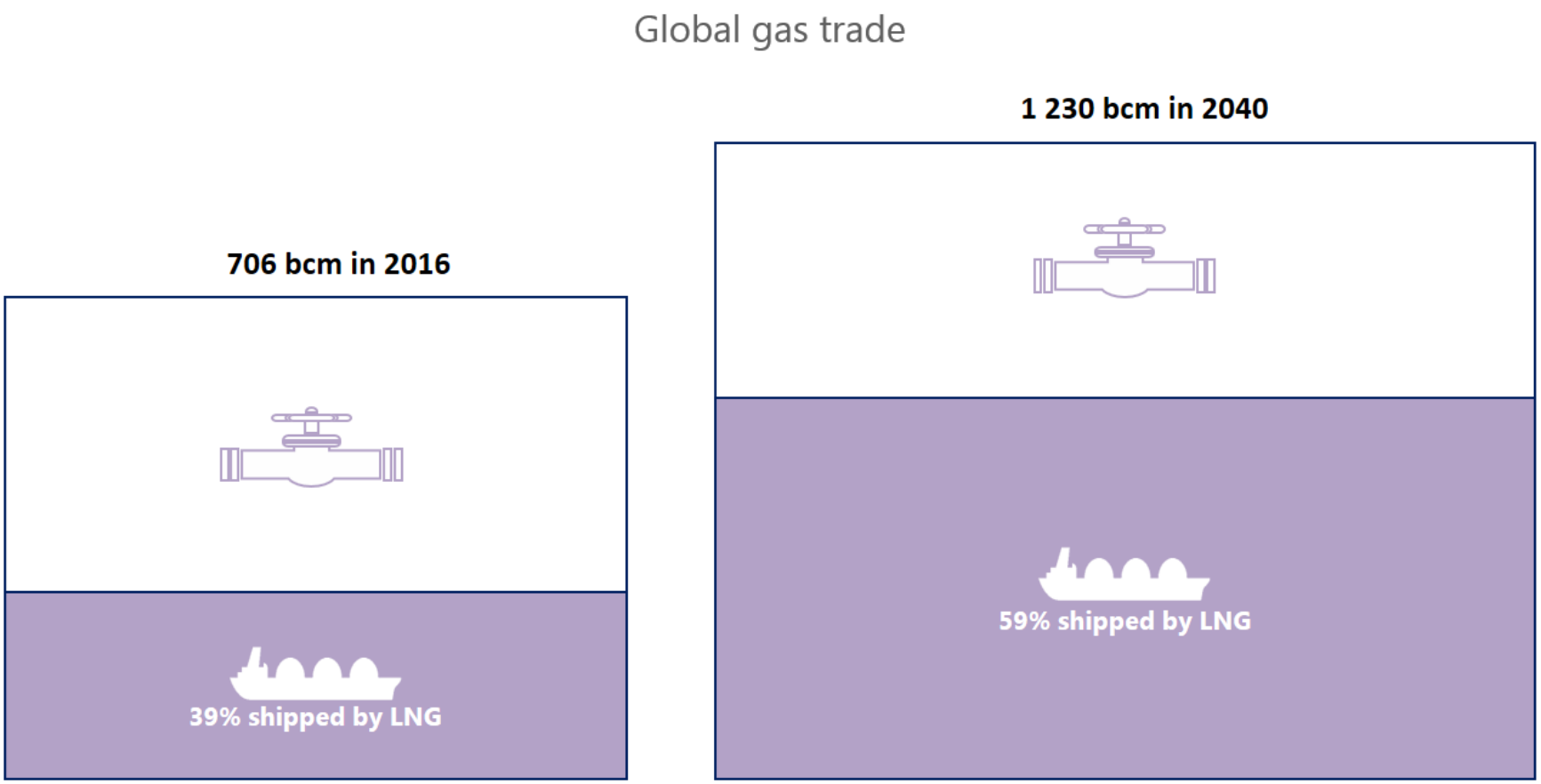
Electric cars are helping to transform energy use for passenger cars, slowing the pace of growth in global oil demand: however, trucks, aviation, shipping & petrochemicals keep oil on a rising trend

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

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

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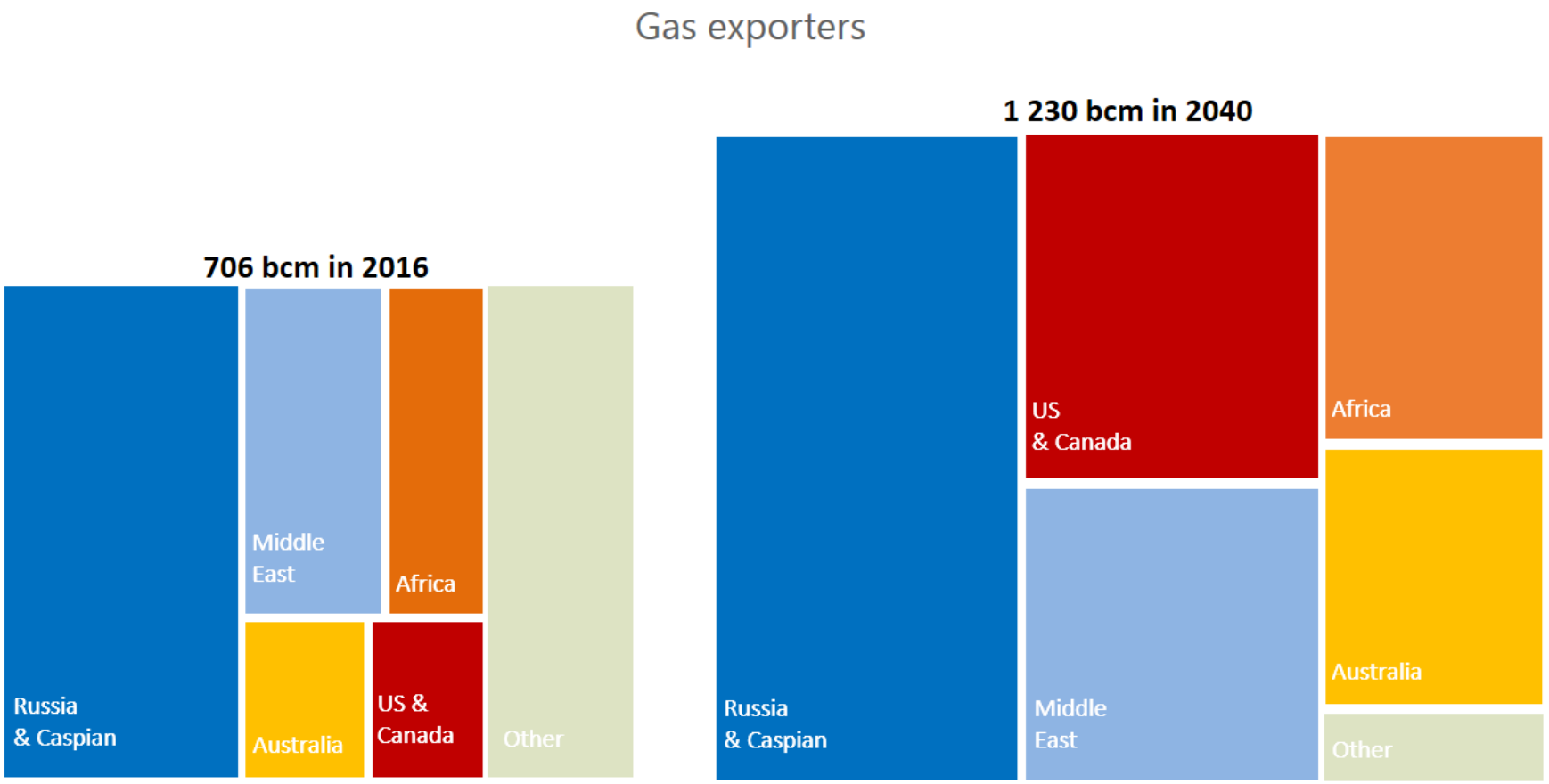

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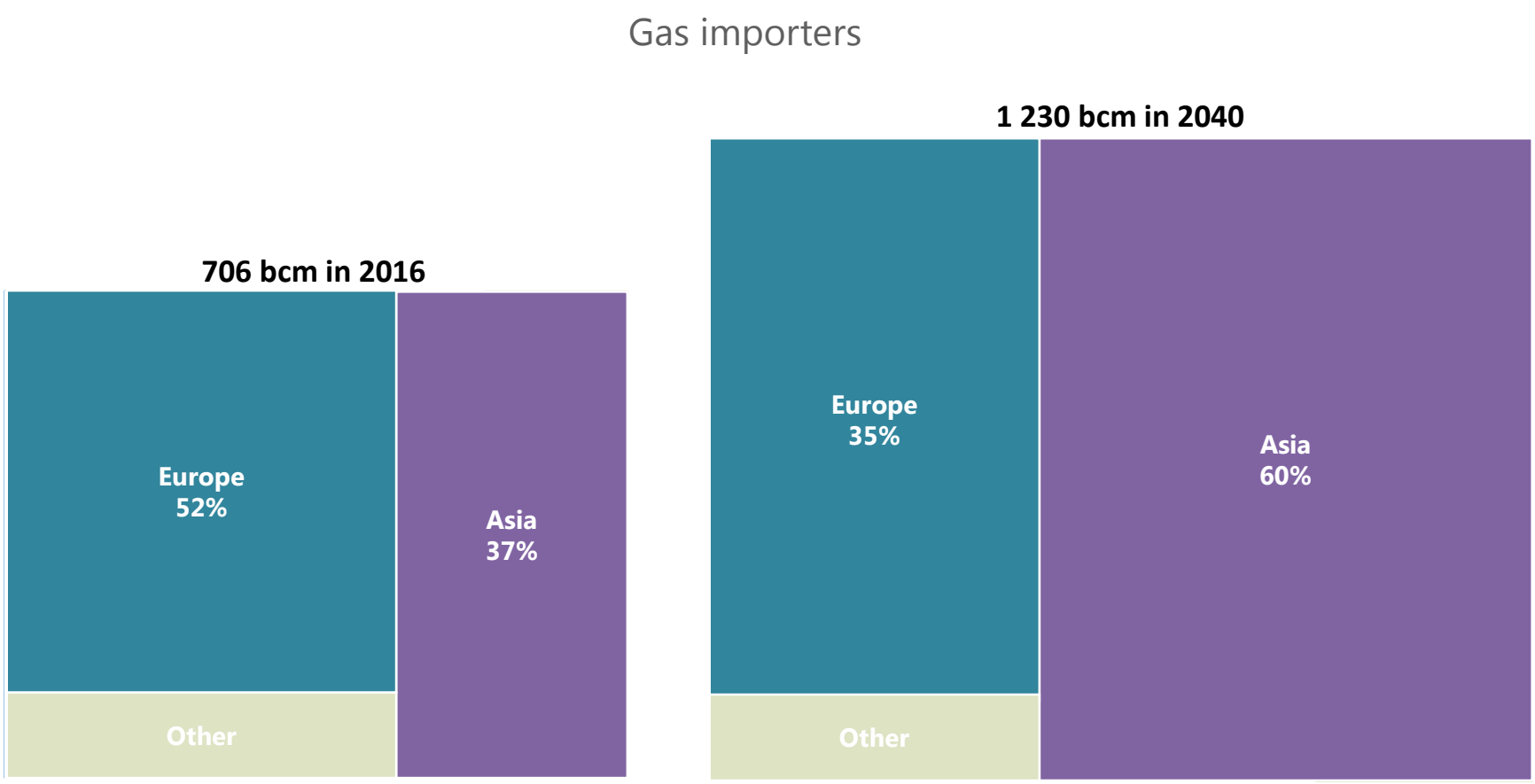

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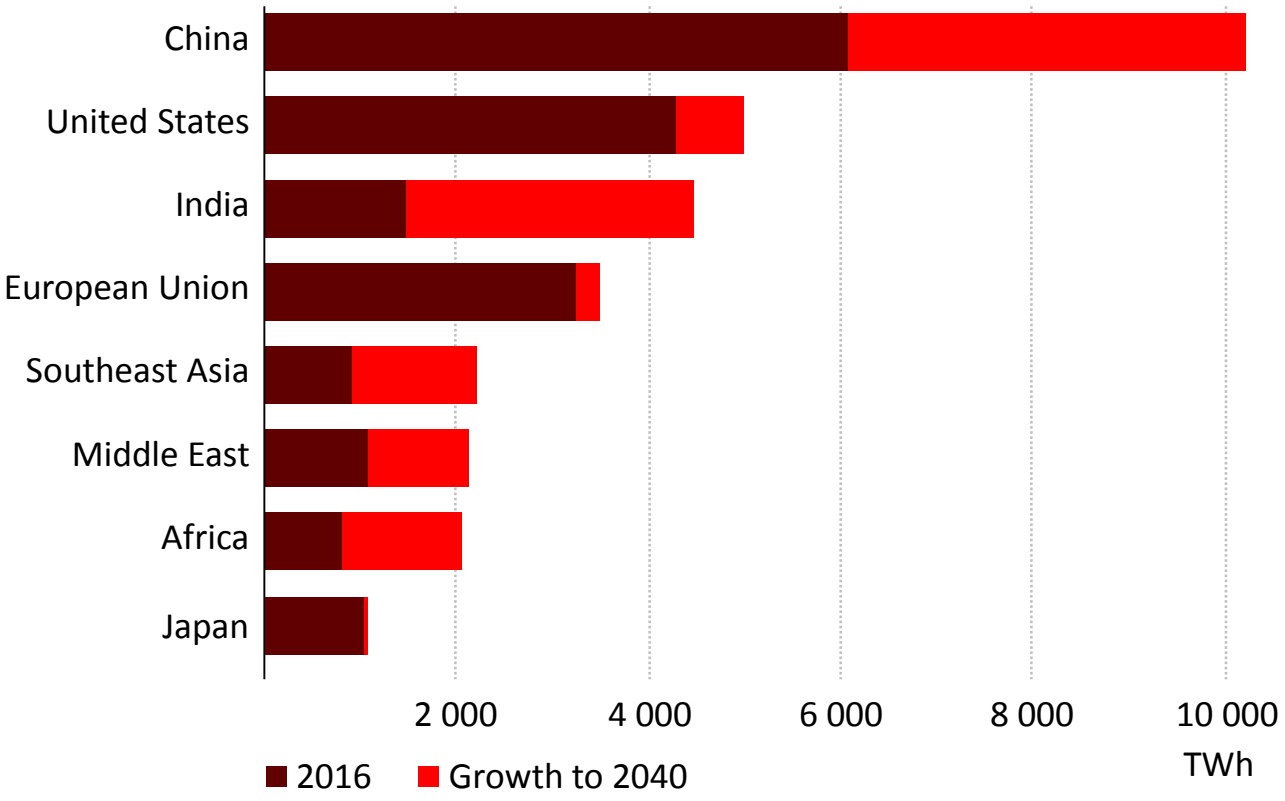
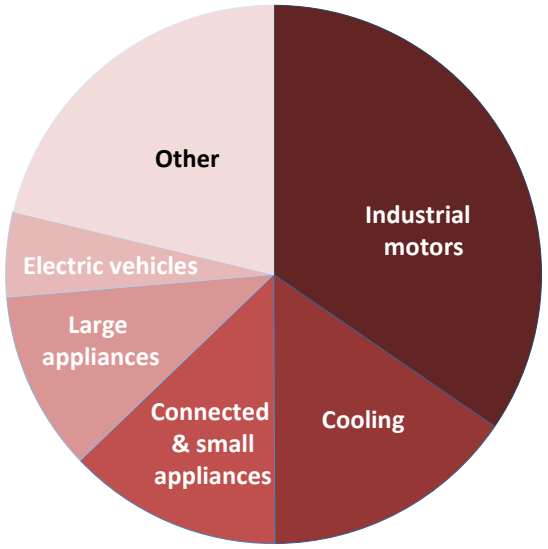
The future is electrifying

Electricity generation by selected region

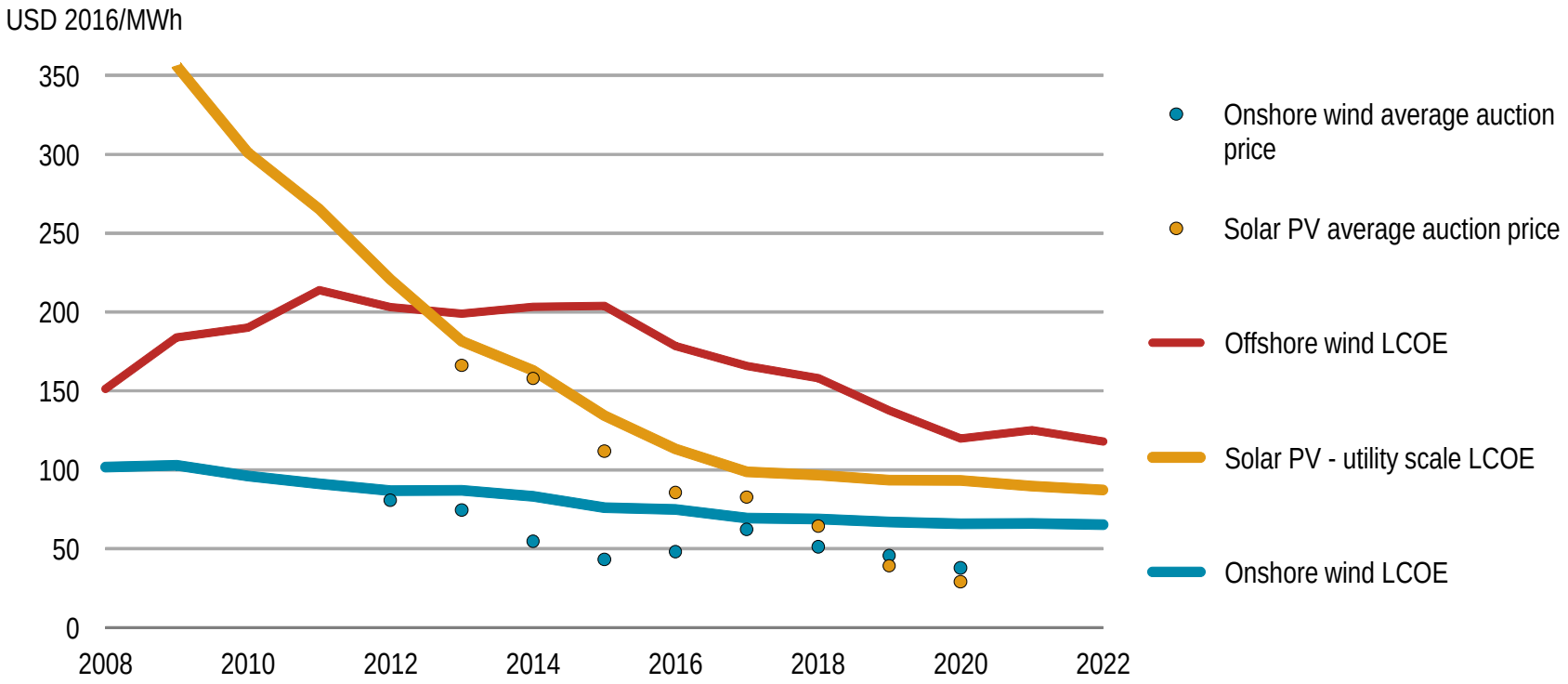


Sources of global electricity demand growth



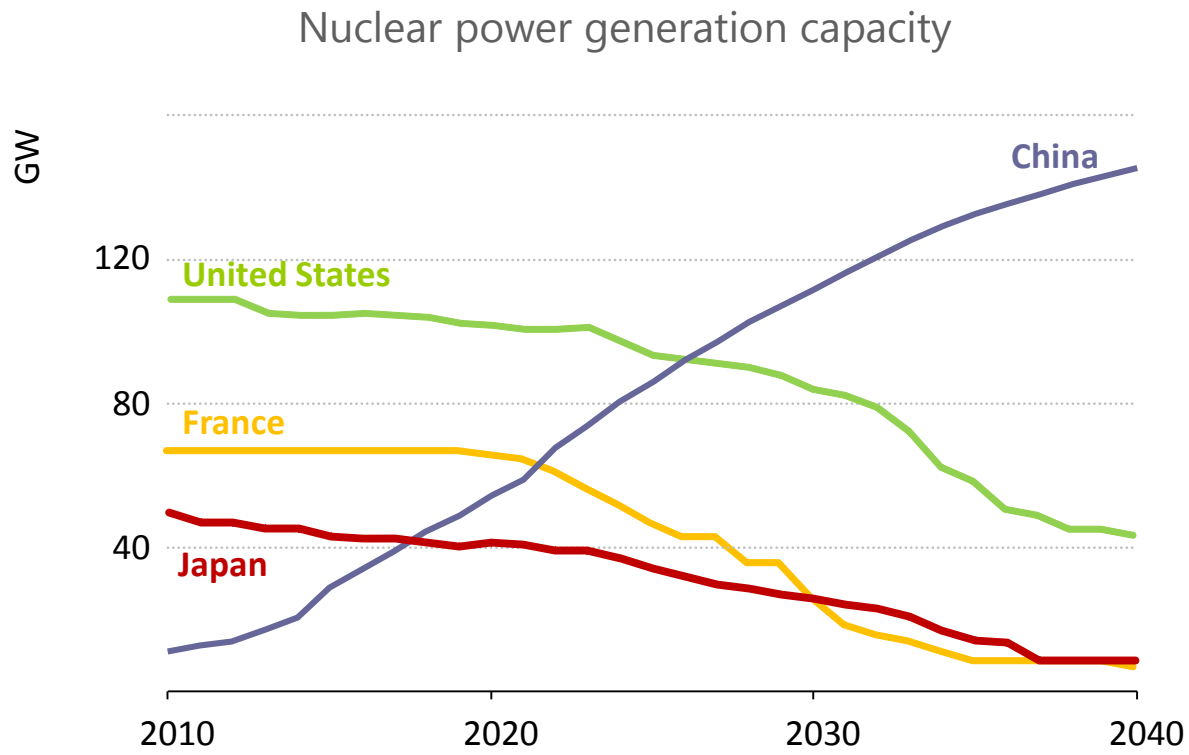
India adds the equivalent of today's European Union to its electricity generation by 2040, while China adds the equivalent of today's United States

Wind and solar PV costs being driven down by competition



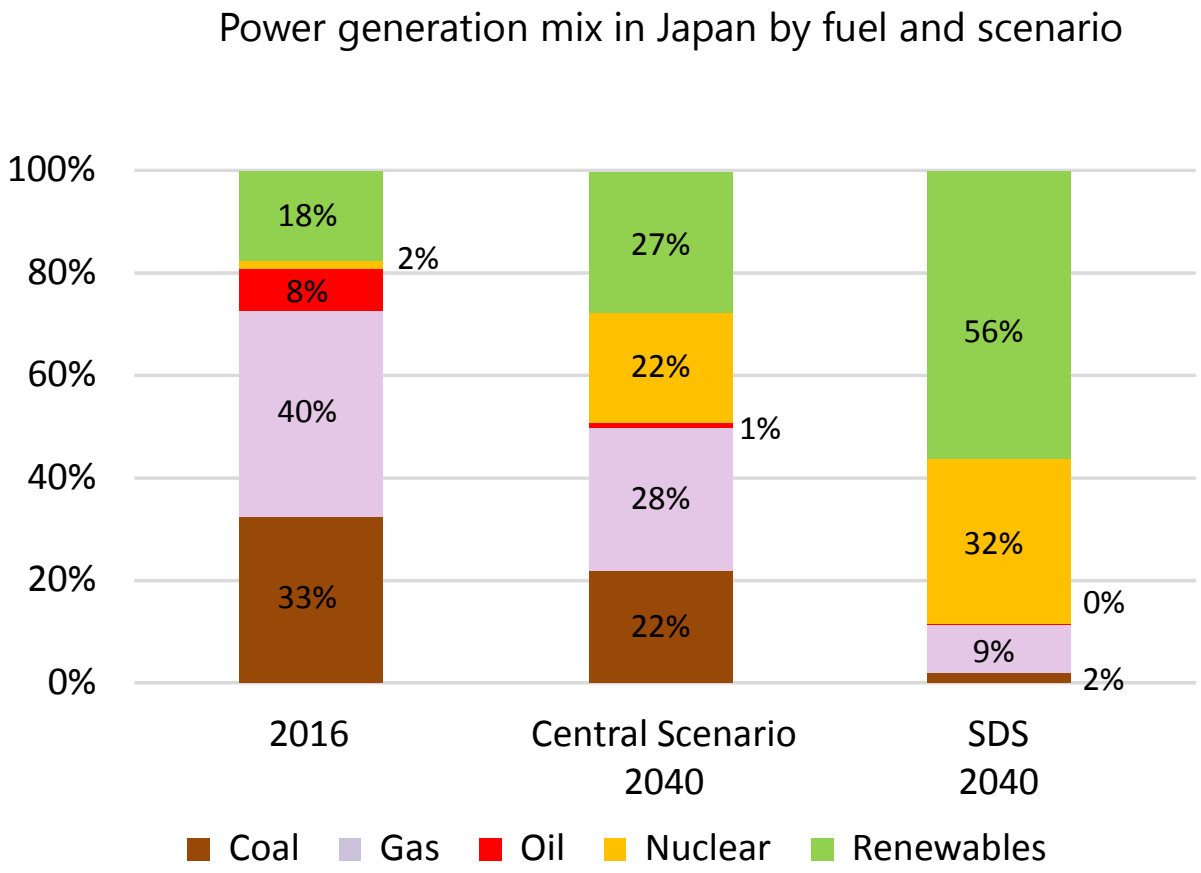
The cost of wind and solar PV have fallen sharply, with further reductions expected;
Cost-optimal integration requires interconnections, flexible generation, storage & demand response

A new leader emerging on nuclear



Without additional lifetime extensions, the largest nuclear fleets face significant declines, while China is soon set to overtake the United States as the global leader

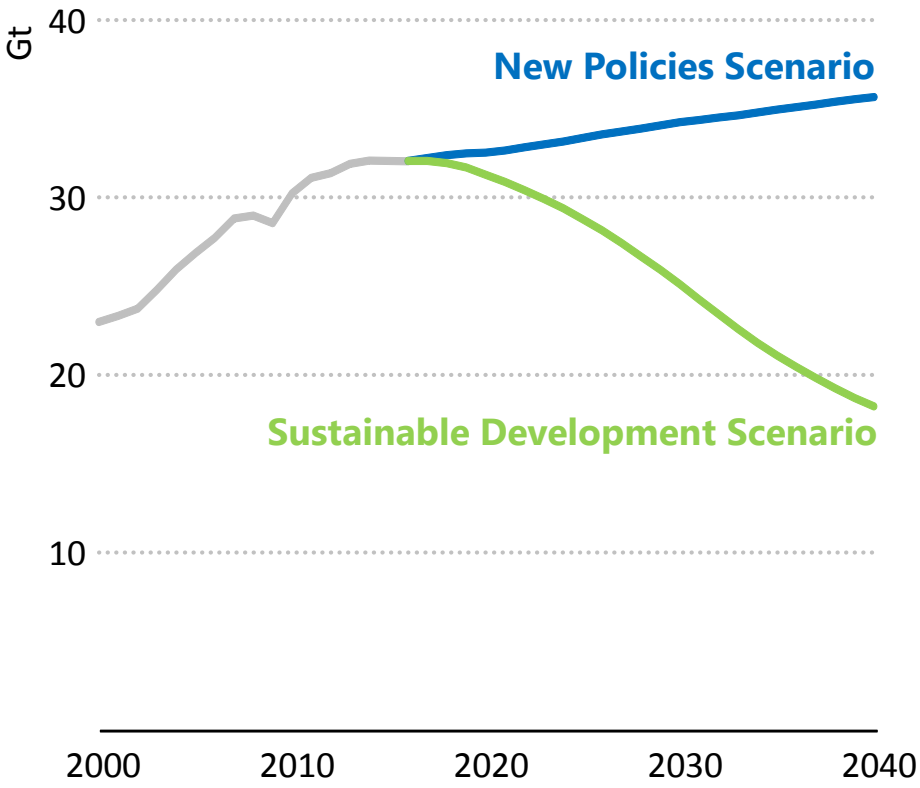
Japan's Power Mix: Policy determines uptake of low-carbon sources



Decarbonisation of Japan's power sector can be achieved through the uptake of variable renewables and the restart of nuclear plants while ensuring their safety

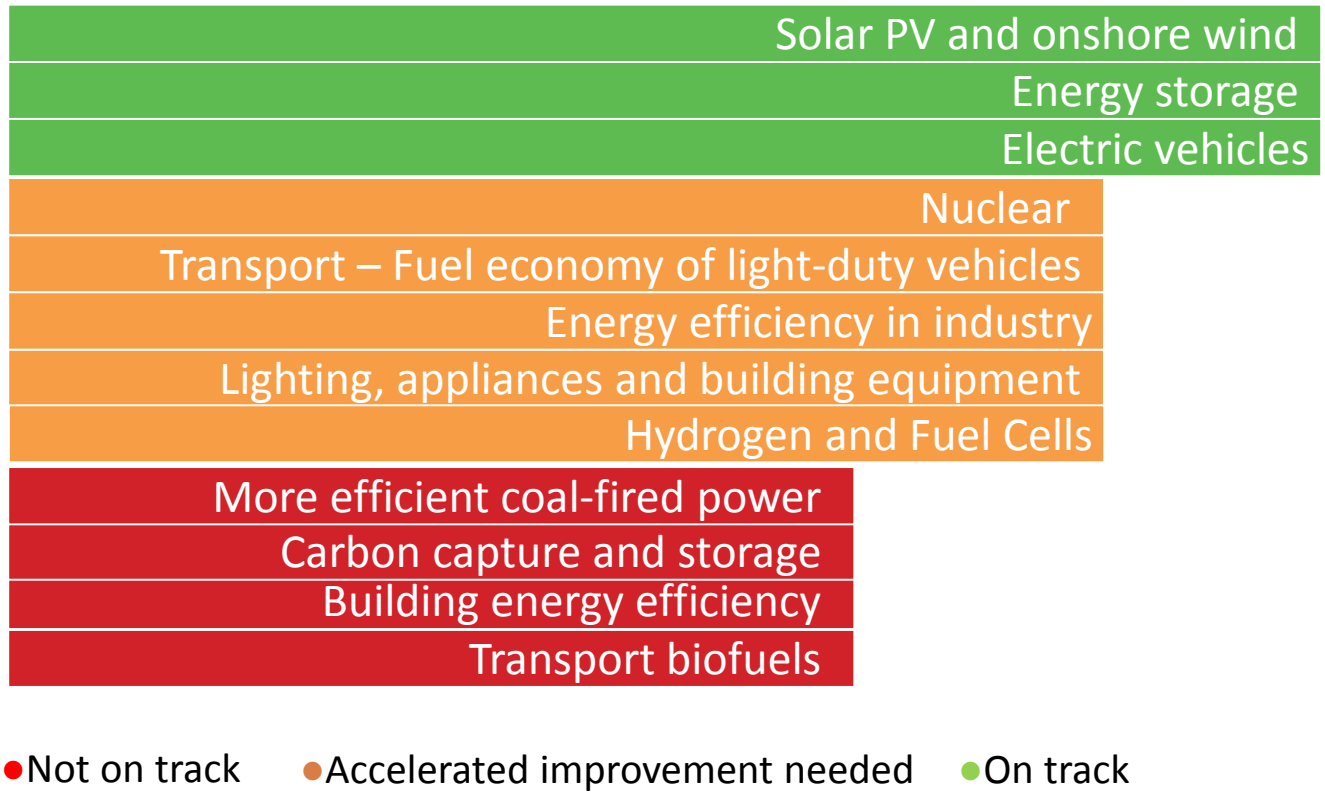
A new strategy for energy & sustainable development

Global CO_2 emissions by scenario



The Sustainable Development Scenario reduces CO_2 emissions in line with the objectives of the Paris Agreement, while also tackling air pollution and achieving universal energy access

The potential of clean energy technology remains under-utilised



Despite good progress in some areas, many technologies still need a strong push to achieve their full potential and deliver a sustainable energy future

Conclusions

- The oil & gas boom in the United States is shaking up the established order, with major implications for markets, trade flows, investment & energy security
- The versatility of natural gas means that it is well placed to grow, but it cannot afford price spikes or uncertainty over methane leaks
- 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
- Concerted action is needed to address climate change, including deployment of all low carbon options
- Electrification & digitalisation are the future for many parts of the global energy system, creating new opportunities but also risks that policy makers have to address

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