

Flame: Global Gas Demand Outlook

The medium- to long-term perspective

May 2019



Energy Insights
By McKinsey

Our Global Energy Perspective provides a detailed demand outlook across regions, sectors and fuels

Key features of our Global Energy Perspective



Granular coverage

Long-term projections to 2050 by country, sector, and energy product (146 countries, 30 sectors, and 55 energy products)



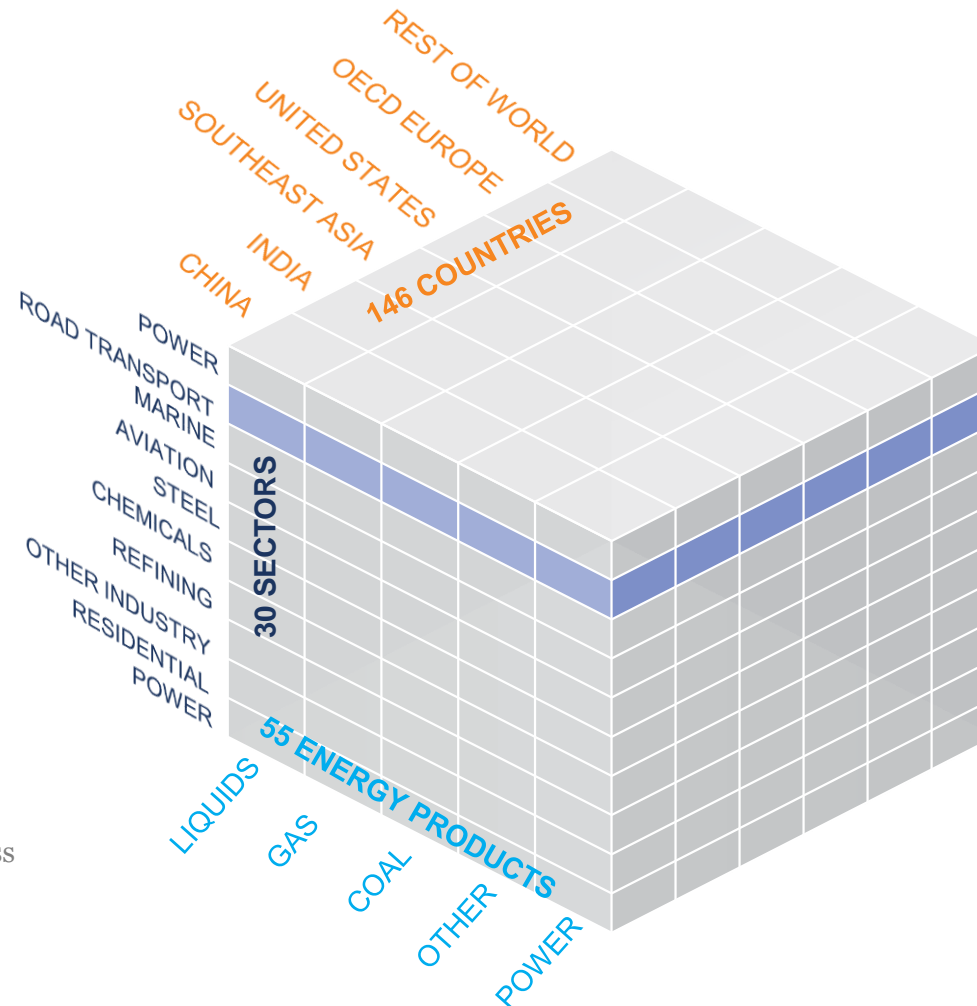
Full transparency and flexibility

Access to all the detail of underlying demand drivers and ability to customize bespoke scenarios



Global reach, local expertise

Access to McKinsey's expertise from across 100+ local offices, 400+ energy experts globally, and 20+ industry practices



Illustrative level of detail

Road transport

5 vehicle segments

- Passenger cars
- 2- and 3-wheelers
- Vans and pickups
- Trucks
- Buses

3x3 vehicle classes

- 3 weight classes
- 3 distance classes (urban, regional, and long-haul)

7 powertrains

- Gasoline
- Battery electric
- Plug-in hybrid
- Hybrid electric
- Natural gas
- Liquefied petroleum gas (LPG)
- Diesel

5 fuels

- Gasoline
- Diesel
- LPG
- Natural gas
- Electricity

Annual projections

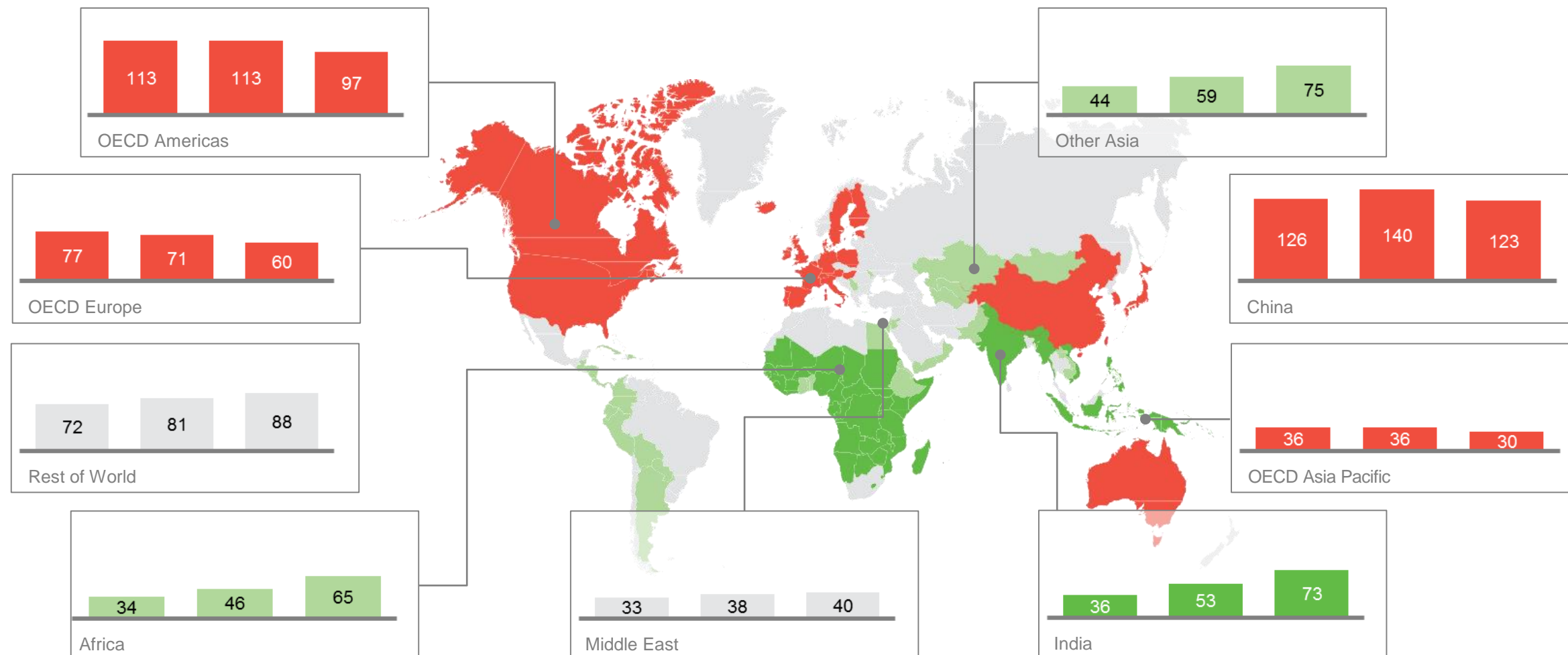
- For 146 countries
- 2016-2050

Energy demand development reflects local dynamics; while most OECD countries see a decline, demand in Africa and India roughly doubles until 2050

Primary energy demand by region, 2016-50

Million TJ

CAGR ■ >2% ■ 1-2% ■ 0-2% ■ <0% ■ 2016 ■ 30 ■ 2050

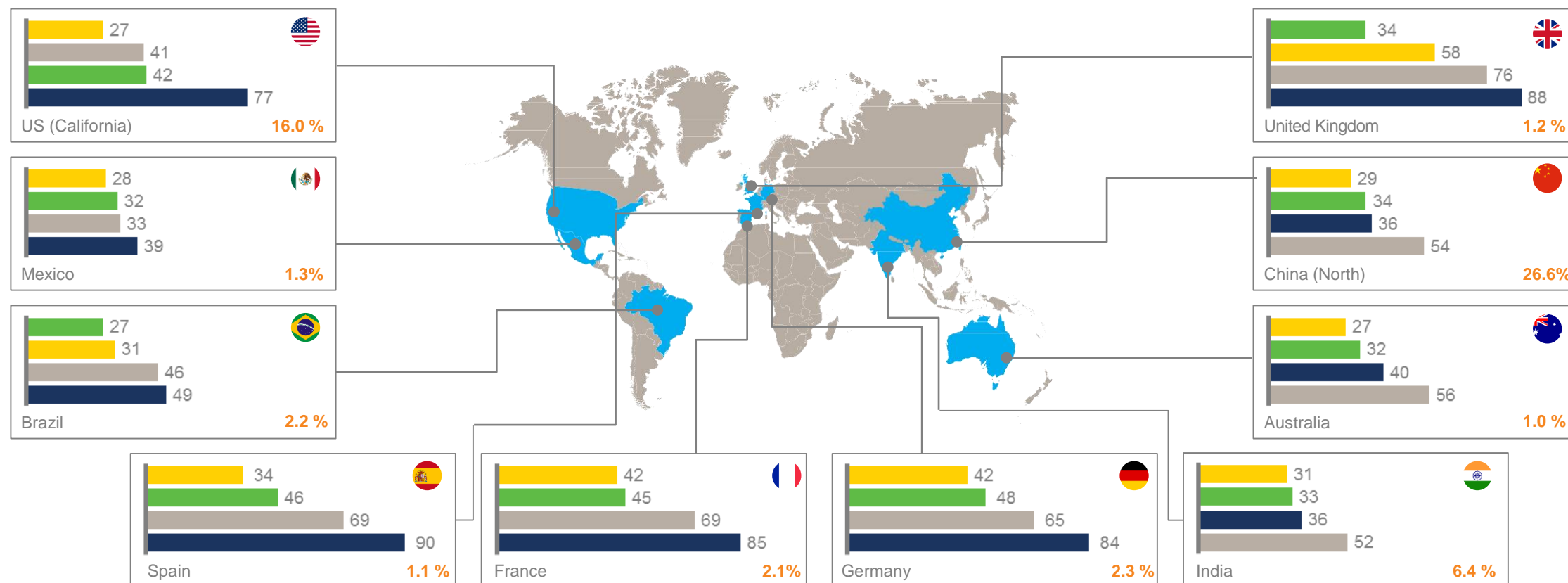


Economics of renewables continue to improve rapidly: by 2020, they are the most economic new-build option across regions

Most economical new-build LCOE¹

2020, USD 2015/MWh

■ Solar
 ■ Wind
 ■ Gas
 ■ Coal
 ○ Share global electricity demand²



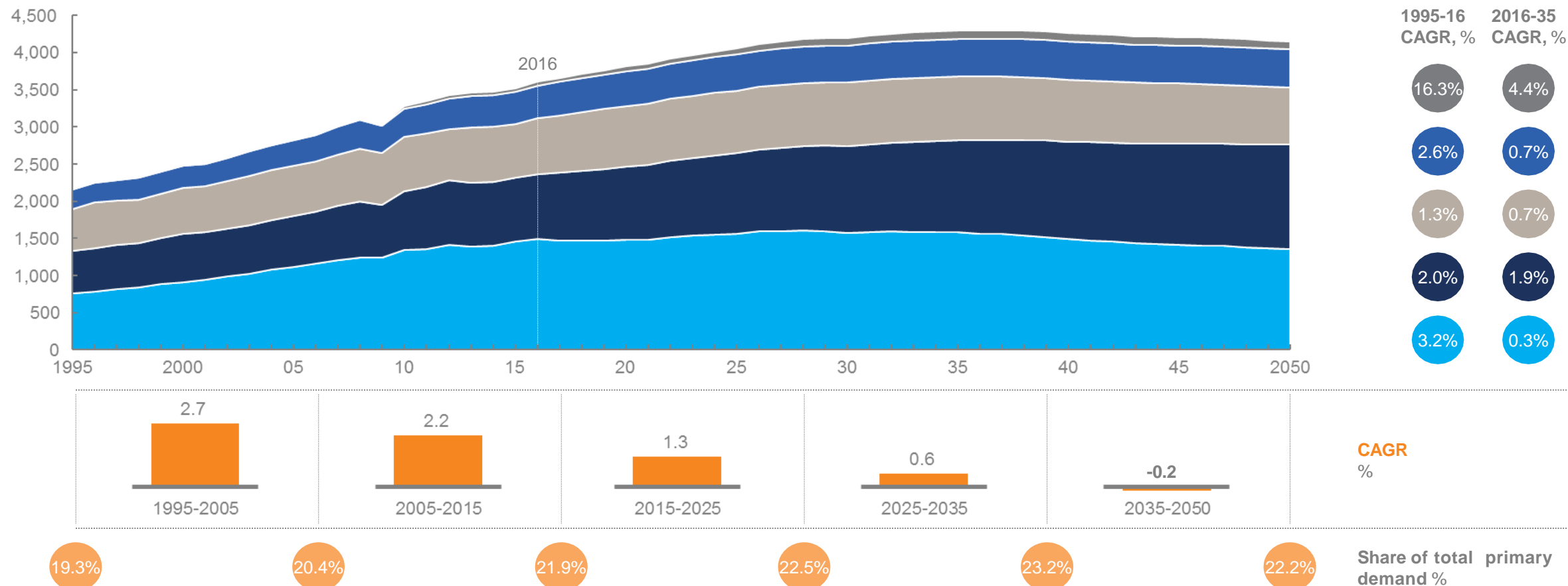
¹ Levelized cost of energy (LCOE) for solar PV and wind in US and China here include subsidies ² Share in global demand for US and China refers to entire country, whereas LCOE figures refer to specific regions (California and Northern China)

SOURCE: McKinsey Energy Insights' Global Energy Perspective, January 2019

Gas is the only fossil fuel which grows its share of total energy demand until 2035 – albeit at declining growth rates – and then plateaus

Natural gas demand by segment¹

bcm



¹ Transport segment in many other reports also includes gas use for pipeline transport. This is included in oil and gas industry's own use above (73 bcm in 2016)

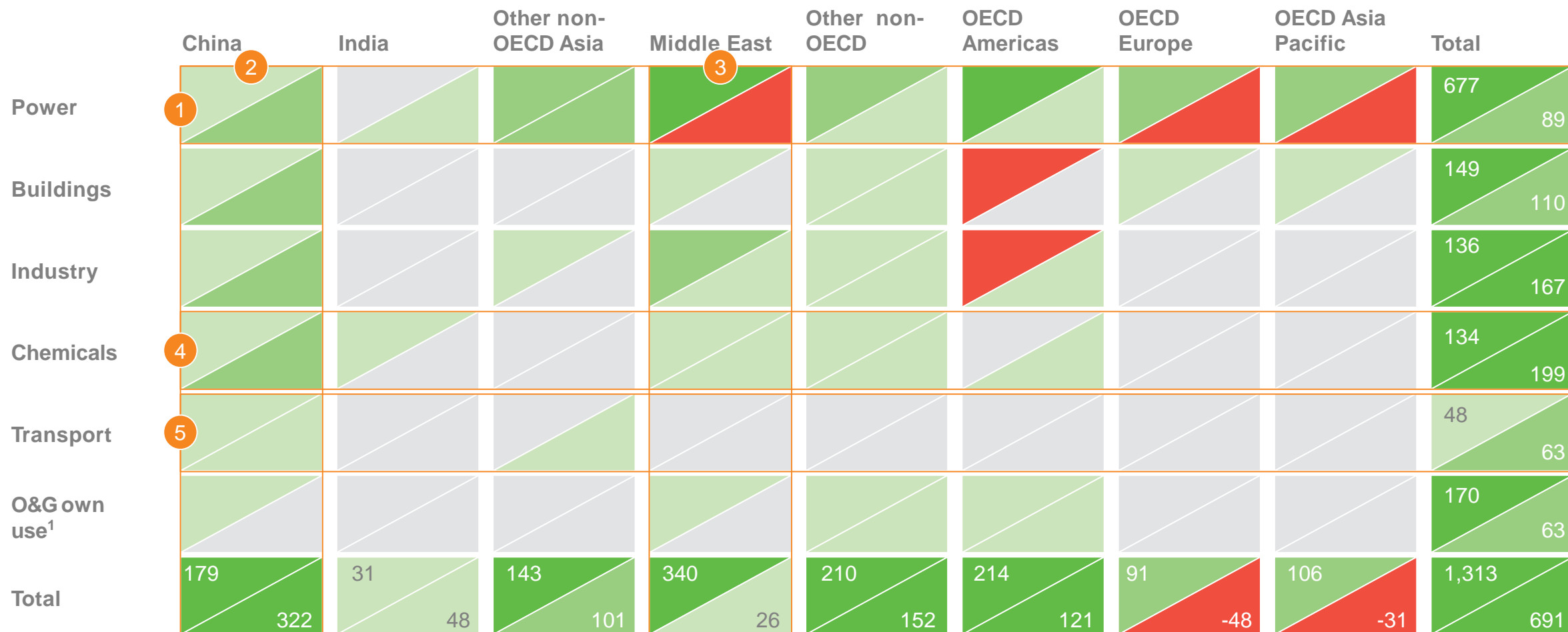
Four major shifts and one continuity are shaping gas demand until 2035

Global gas demand change between 1997-2016 and 2016-35

bcm

1997-2016
2016-2035

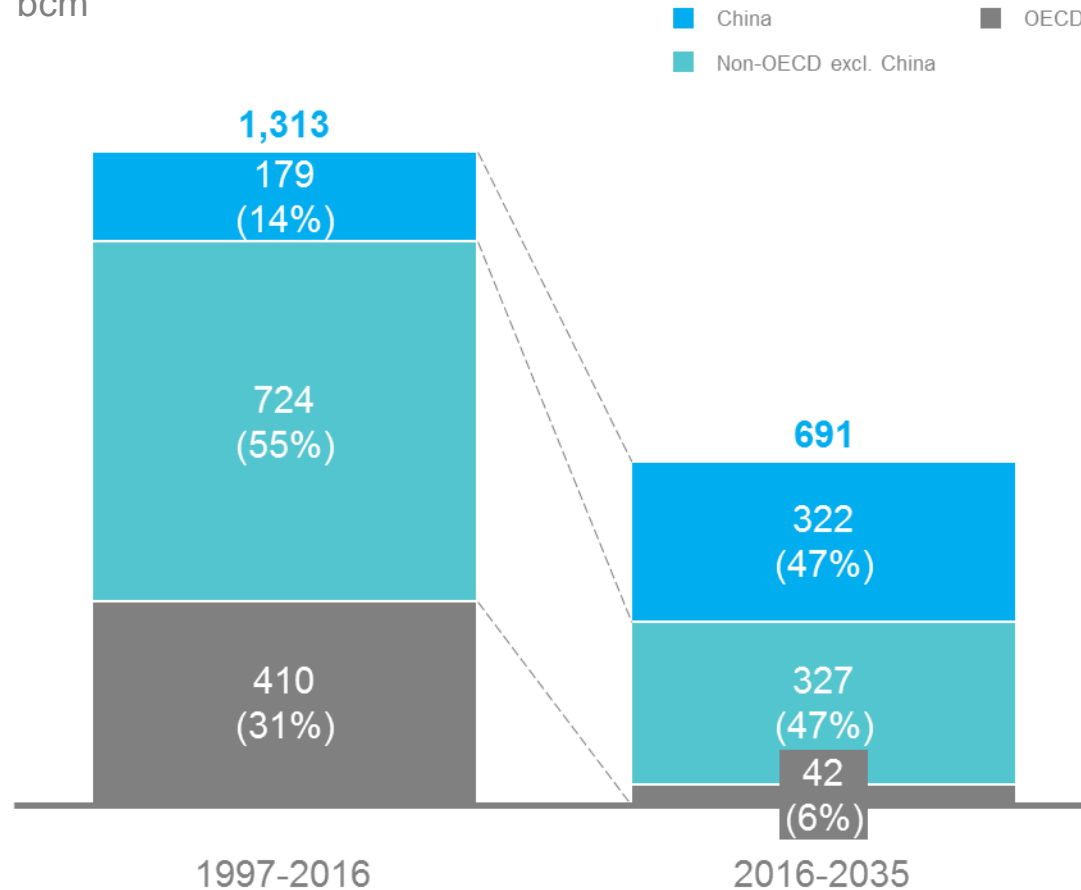
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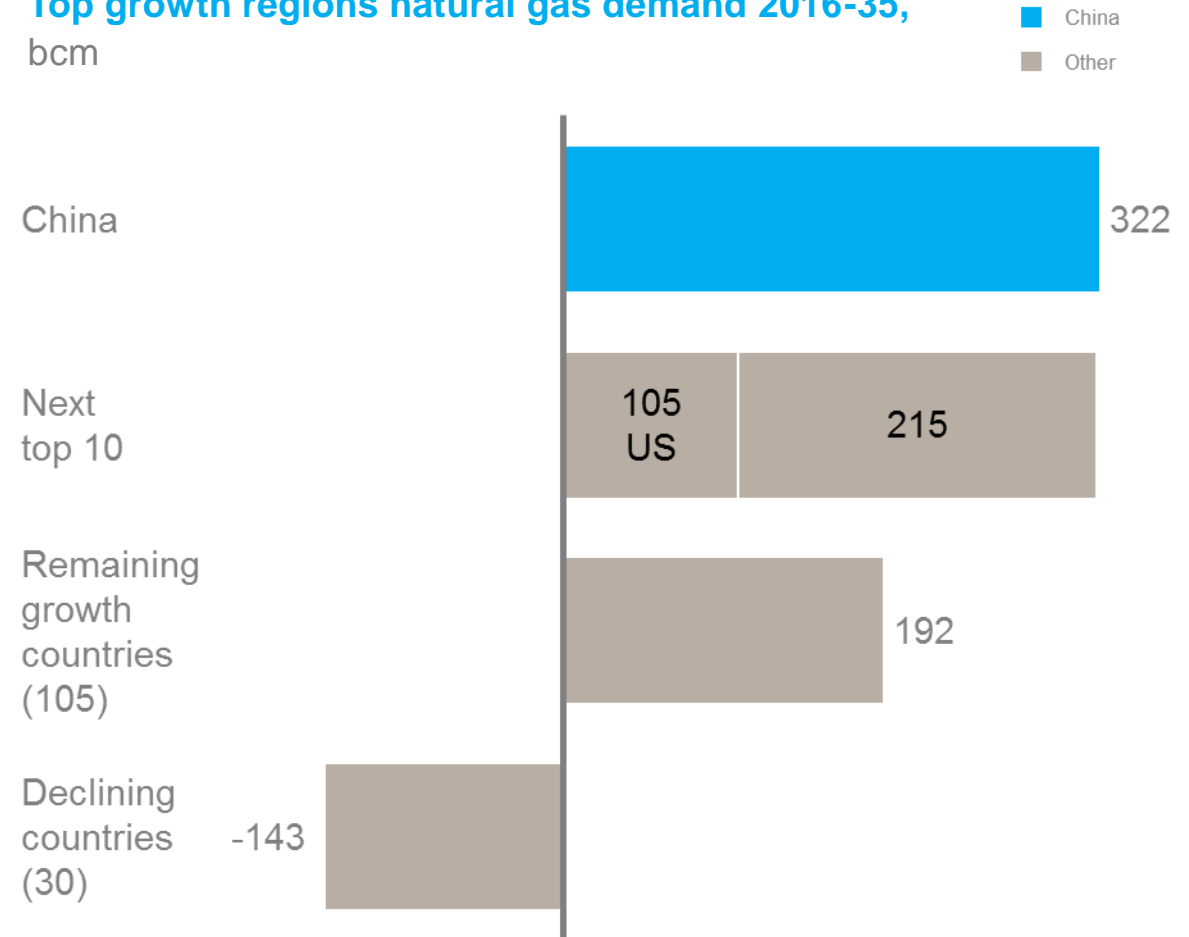
¹ The decline in growth of O&G own use is following largely the development of production levels in the respective countries

China's gas demand growth is greater than that of the next 10 largest growth countries, including the US, and represents nearly half of demand growth through 2035

Natural gas demand growth past vs. future by region, bcm



Top growth regions natural gas demand 2016-35, bcm



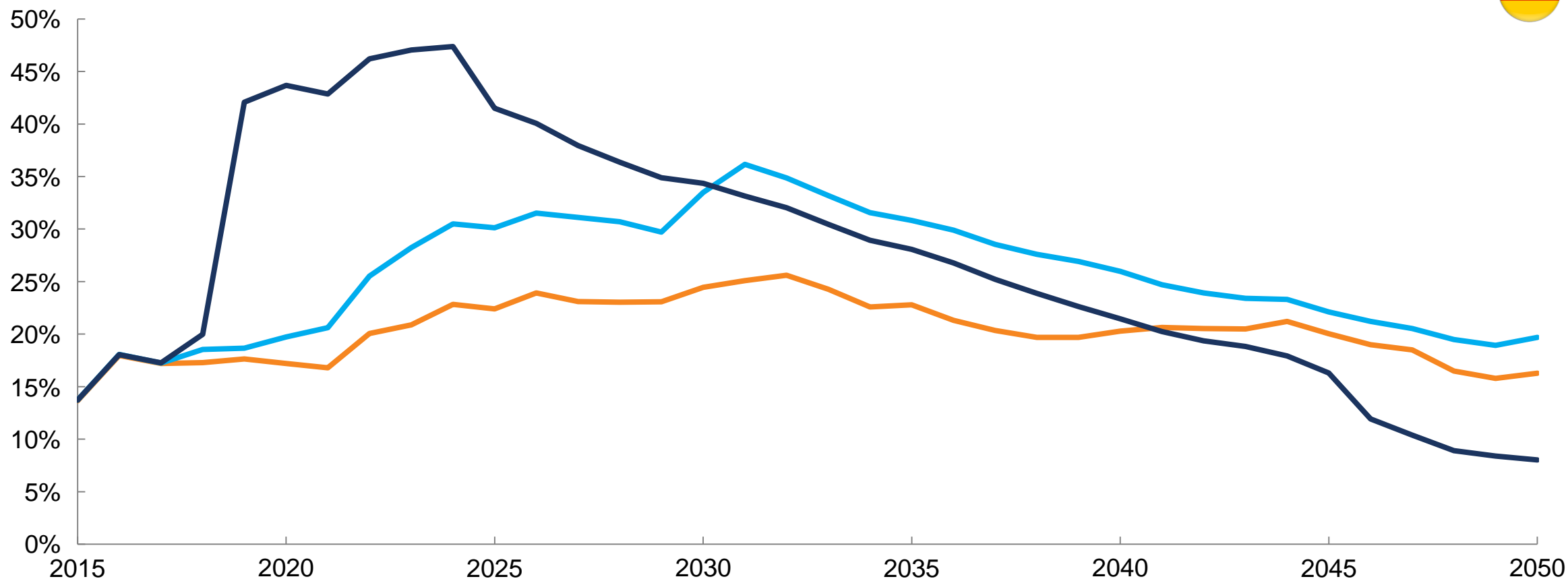
1 Besides the US, top 10 include Egypt, India, Indonesia, Iran, Nigeria, Pakistan, Qatar, Russia, and Ukraine

2 Main demand declines in France, Italy, Japan, United Kingdom, and United Arab Emirates

Carbon pricing could increase gas demand in Germany, but too high a price reduces it long-term

Gas-to-power demand in Germany at different carbon prices

% of generation mix



1 Scenarios different to 6 USD are ramped up to target price until 2025 and then kept constant

2 Based on 2017 average EUA price average (~5.5€/t)

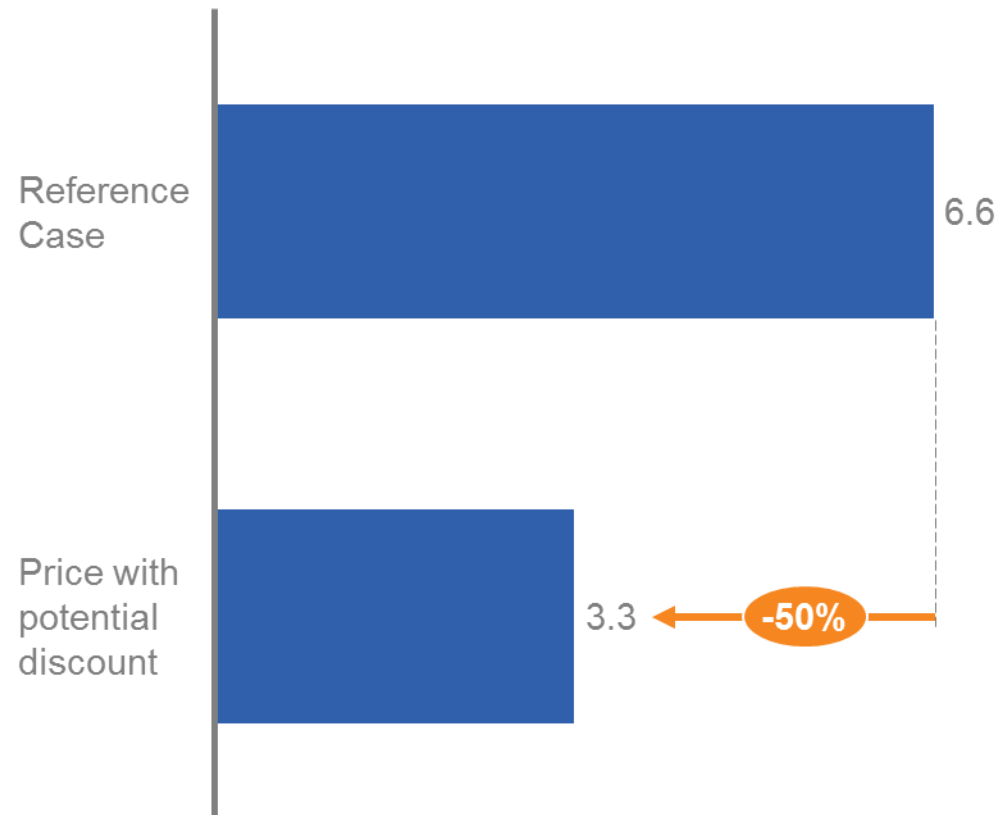
SOURCE: McKinsey Energy Insights' Global Energy Perspective Reference Case 2019

Given the increasing competitiveness of renewables vs. gas, even halving gas prices will only enable marginal incremental demand



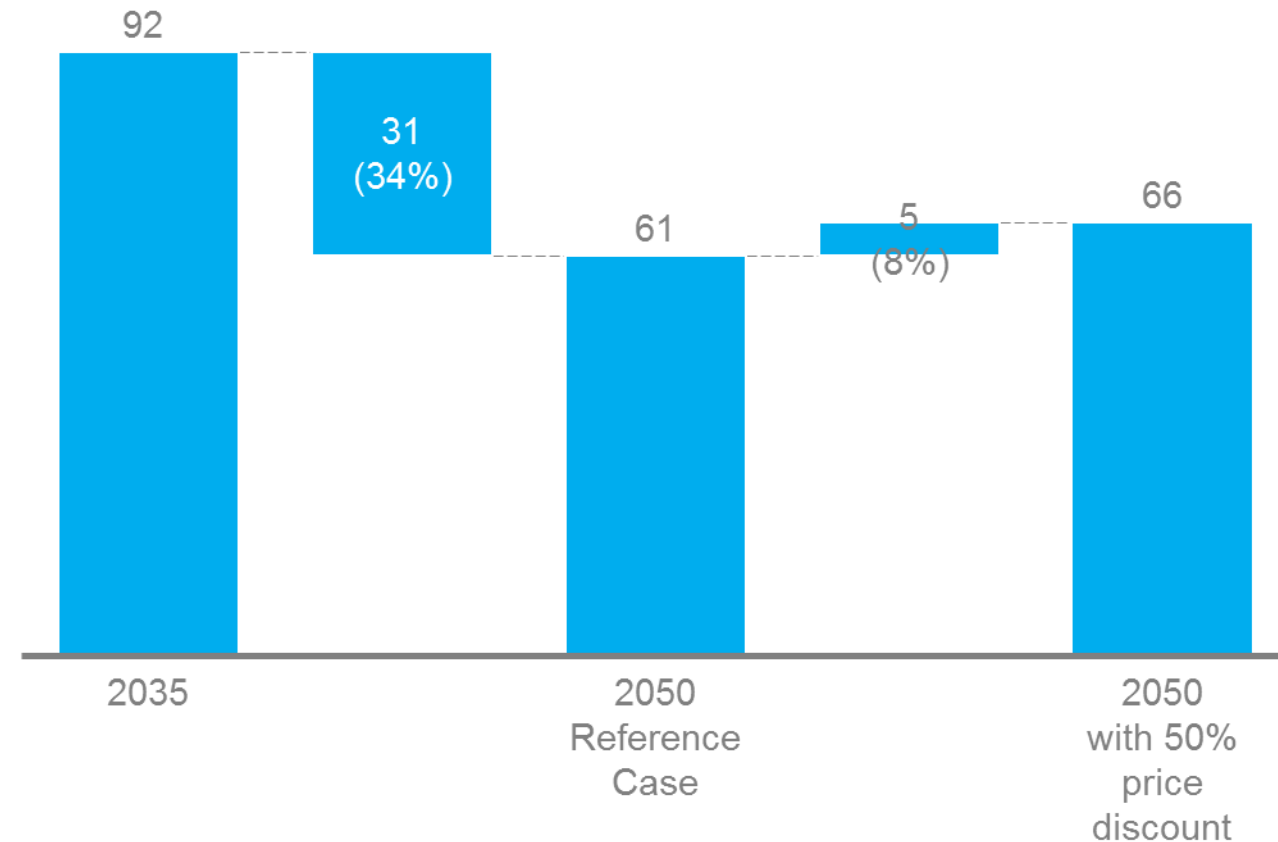
German gas price 2035 Reference Case vs. reduced price

USD/mmbtu



German natural gas demand 2035-50 Reference Case price vs. reduced

bcm

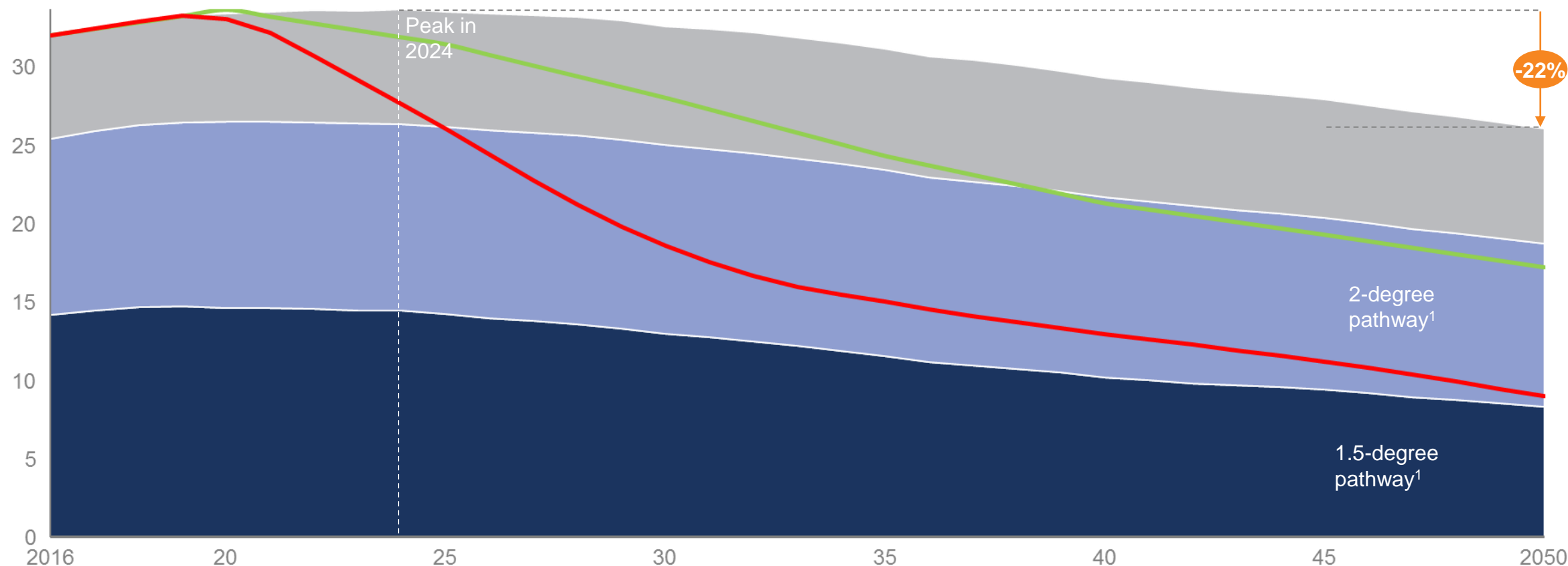


Global carbon emissions peak in 2024 and fall by ~20% by 2050, primarily driven by a reduction in emissions from coal

Global energy-related CO emissions per fuel

GtCO₂ p.a.

■ Natural gas ■ Oil ■ Coal



¹ Median of all Intergovernmental Panel on Climate Change (IPCC) scenarios that lead to 1.5 or 2 degree warming or less McKinsey Energy Insights' Global Energy Perspective, January 2019, IEA, IPCC/IAMC 2-degree and 1.5 degree scenarios