

# Global Energy Perspective: Reference case 2018

CAREC ESSC presentation | 13 March 2018

**ADB** ASIAN DEVELOPMENT BANK



Energy Insights  
By McKinsey

## McKinsey Energy Insights

4

Hubs in Houston, London,  
Amsterdam, South & East Asia  
(ASEAN, China, India, Korea)

75%

Of hires with energy  
backgrounds

170+

Practitioners



## McKinsey's Global Energy Practice

#1

Ranked energy  
consultancy

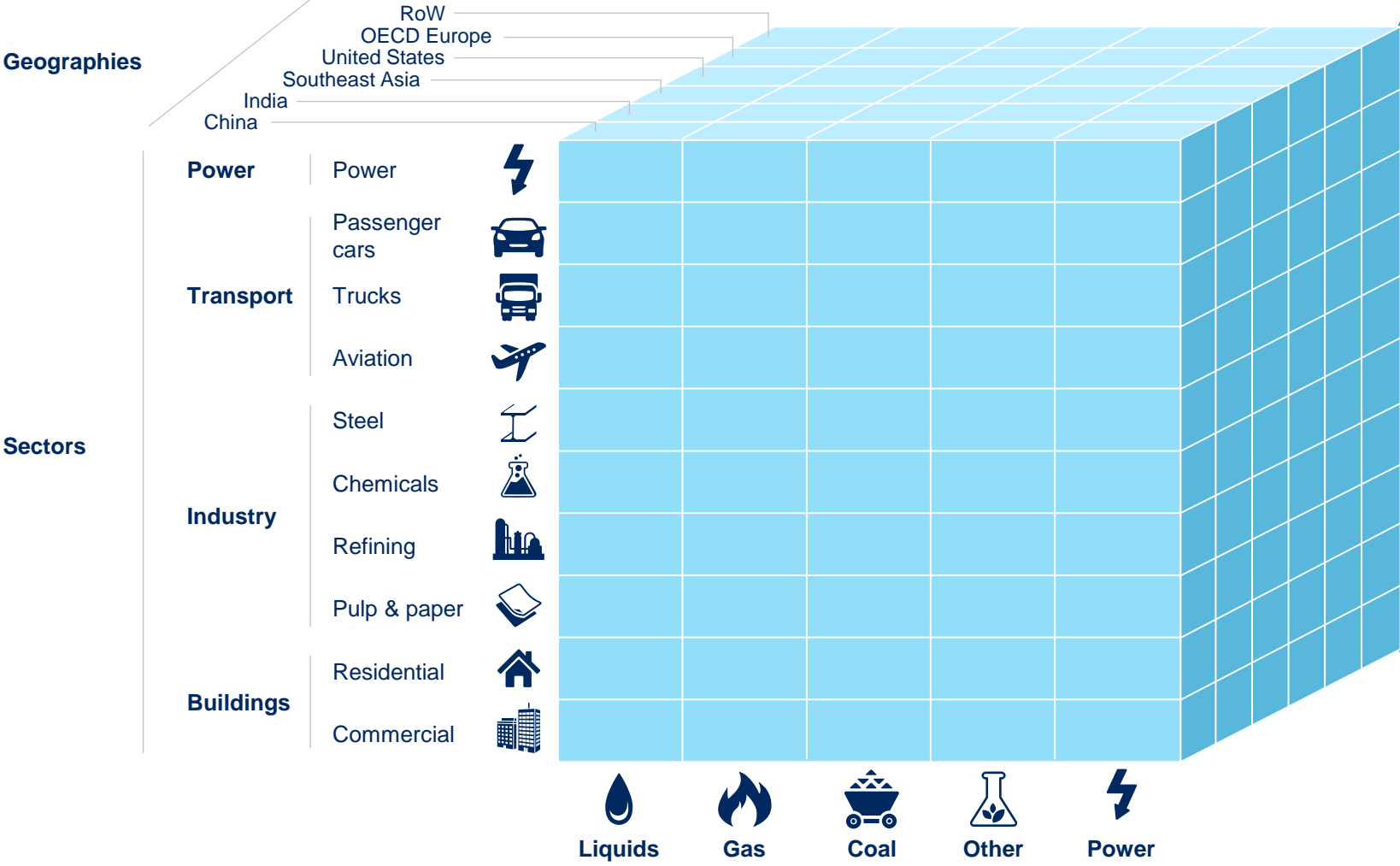
90%

of global energy majors  
served

1.300+

Practitioners

# With our Global Energy Perspective, we built a fundamental energy demand outlook



### Granular coverage

Long-term projections to 2050 across 145 countries, 28 sectors and 57 energy products



### Full transparency & flexibility

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



### Global reach, local expertise

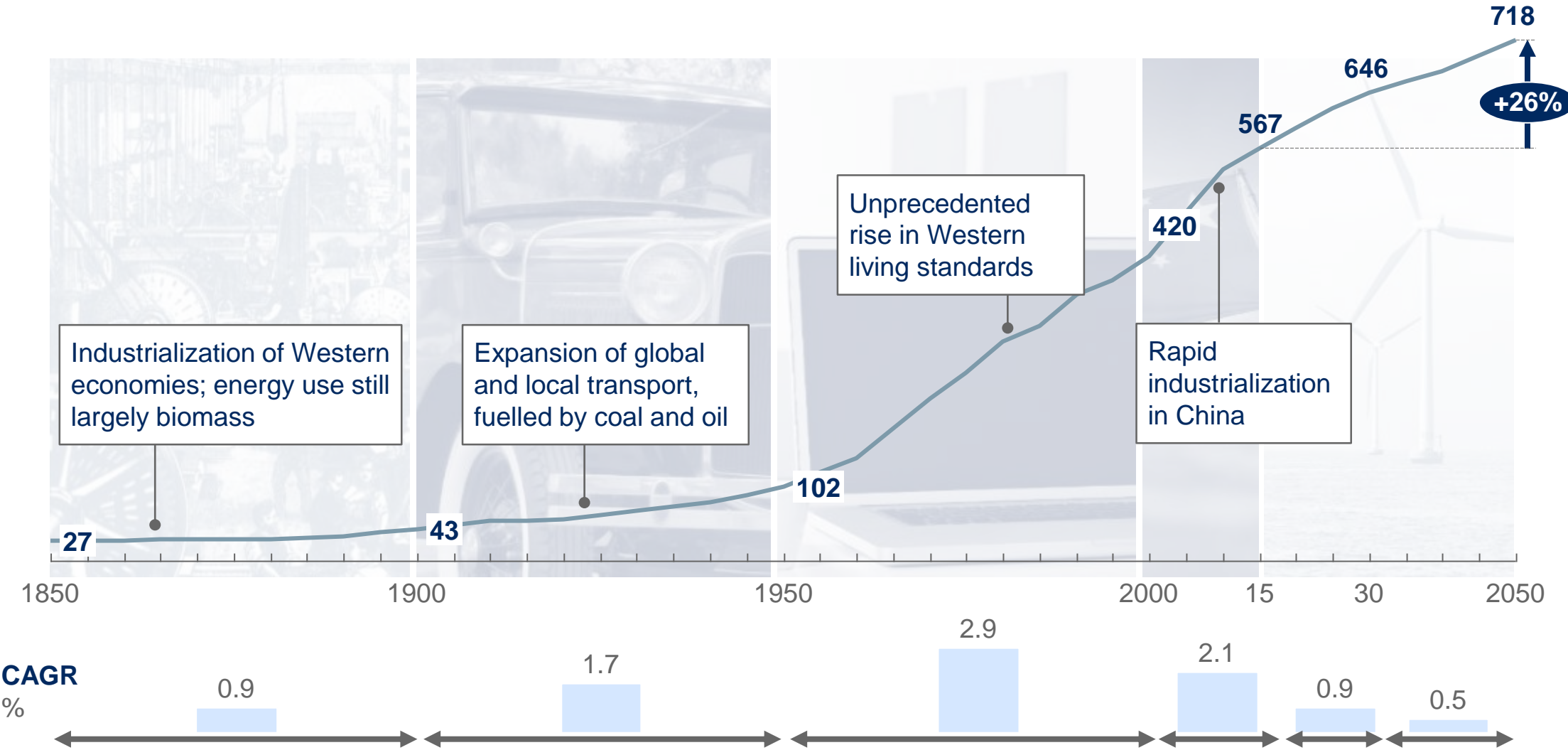
Access to McKinsey's expertise from across >100 local offices, > 400 energy experts globally and >20 industry practices

**1.  
Global energy demand  
growth decelerates,  
following a structural  
decline in energy  
intensity**



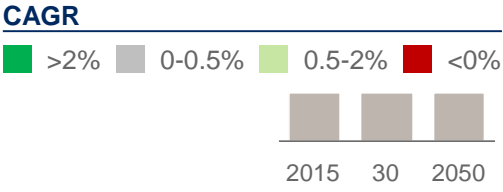
# Global energy demand rises by one quarter over 2015-50, but the rate of growth slows to a pace not seen in the past 100 years

Global primary energy demand, Million terajoules

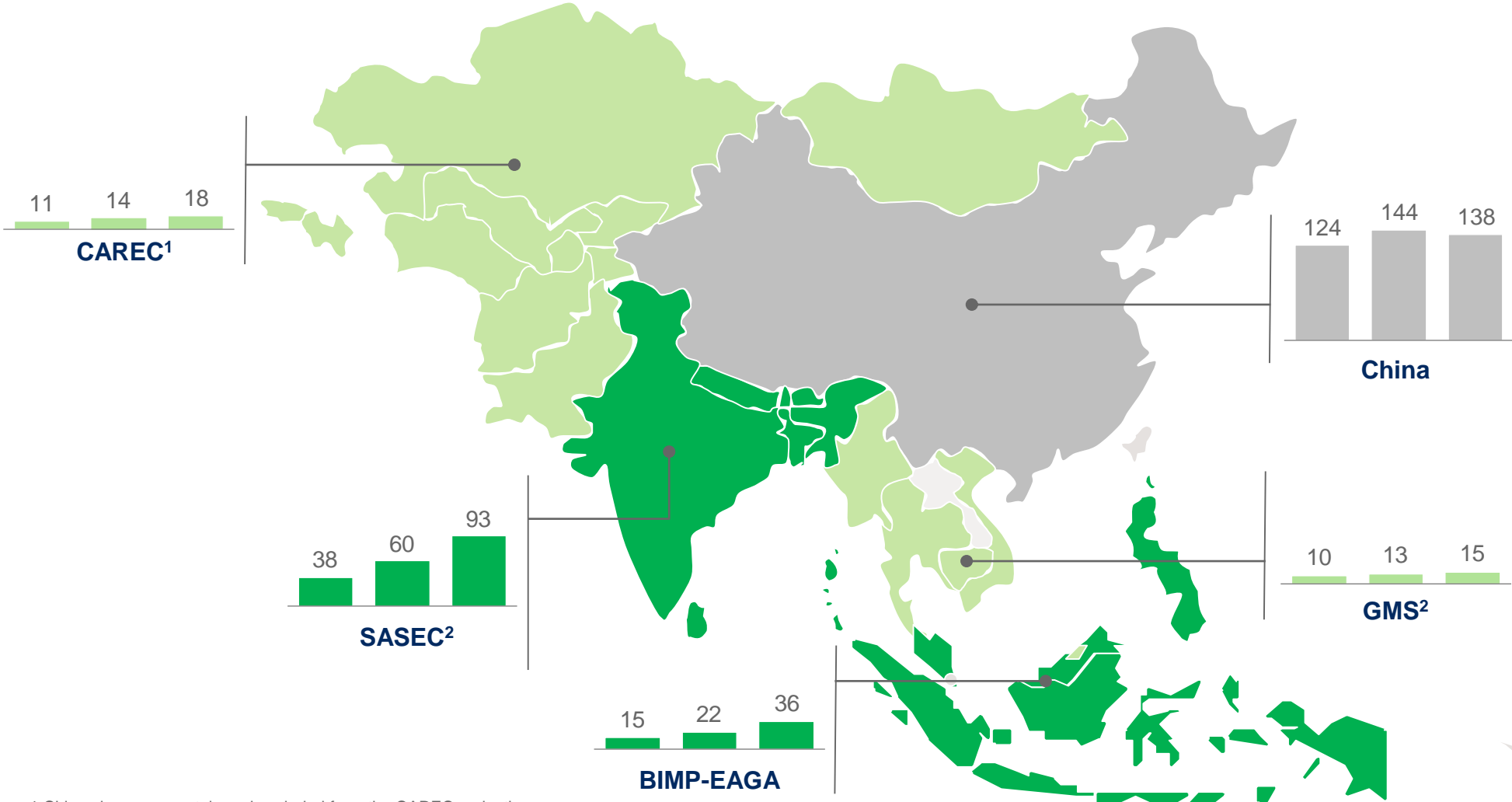


SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017; IEA Energy Balances (Historical); Smil, V. (Historical)

# Energy demand is expected to continue its growth in the Asian regions, with largest growth rates are expected in SASEC



**Primary energy demand by region, 2015-50, Million terajoules**



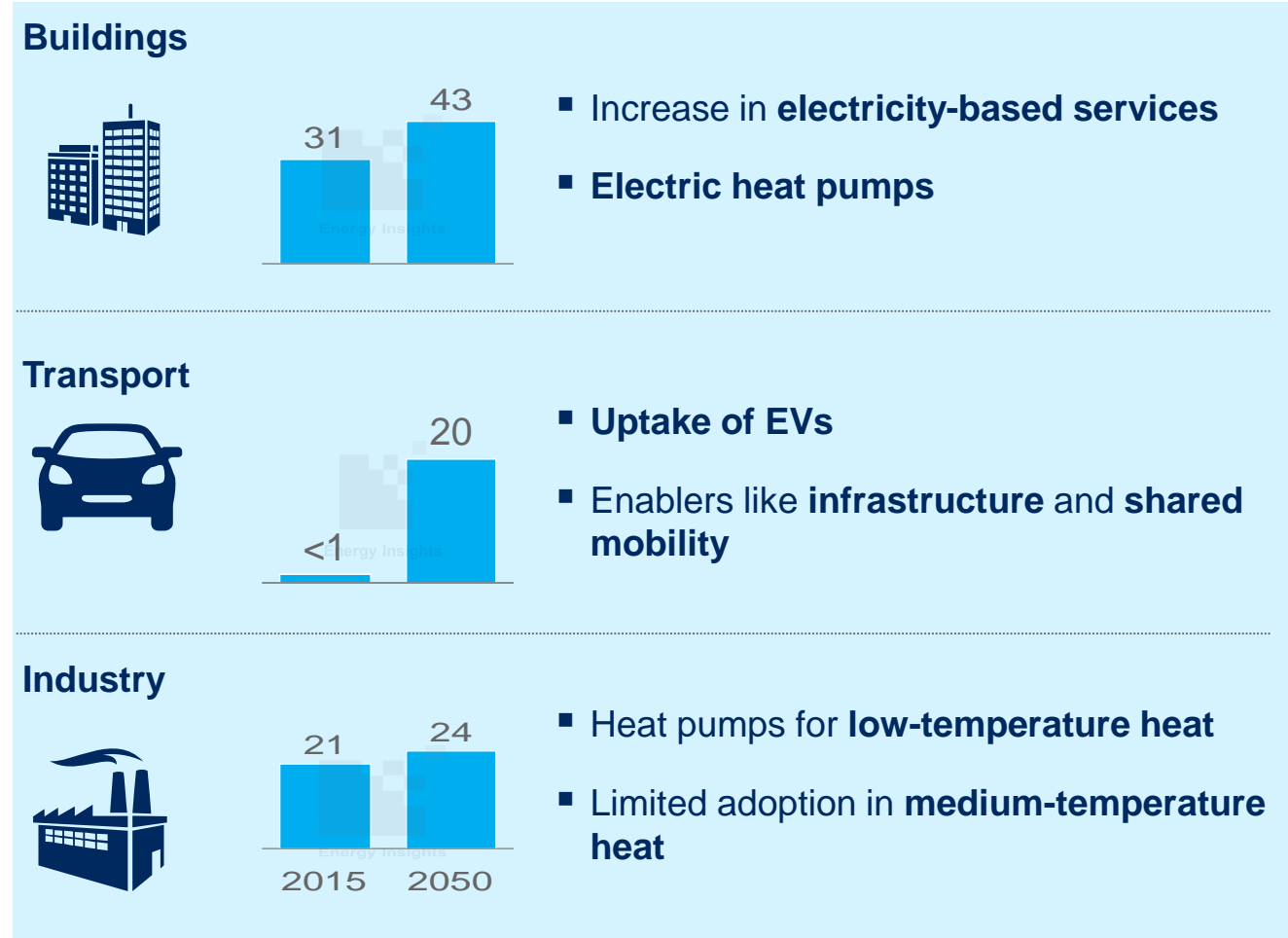
1 China shown separately and excluded from the CAREC projection  
 2 Myanmar is included with GMS

**2.  
Electricity demand  
grows 4 times faster  
than all other fuels**

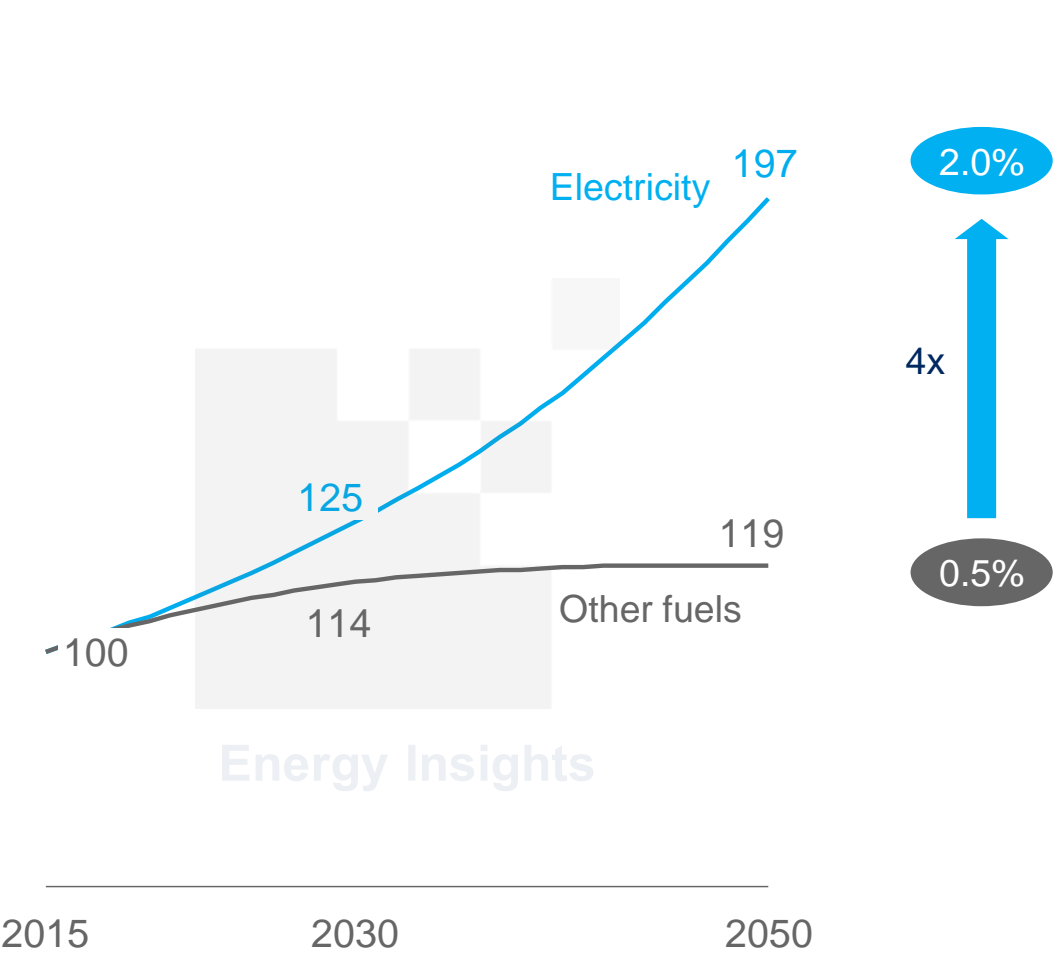


# Global electricity demand grows 4 times faster than all other fuels

**Electrification<sup>1</sup>, Electricity % of final energy demand**



**Final energy demand, 2015=100**



<sup>1</sup> Buildings includes residential buildings in OECD Europe and OECD Americas; transport includes passenger cars, trucks, vans, buses, and 2&3 wheelers



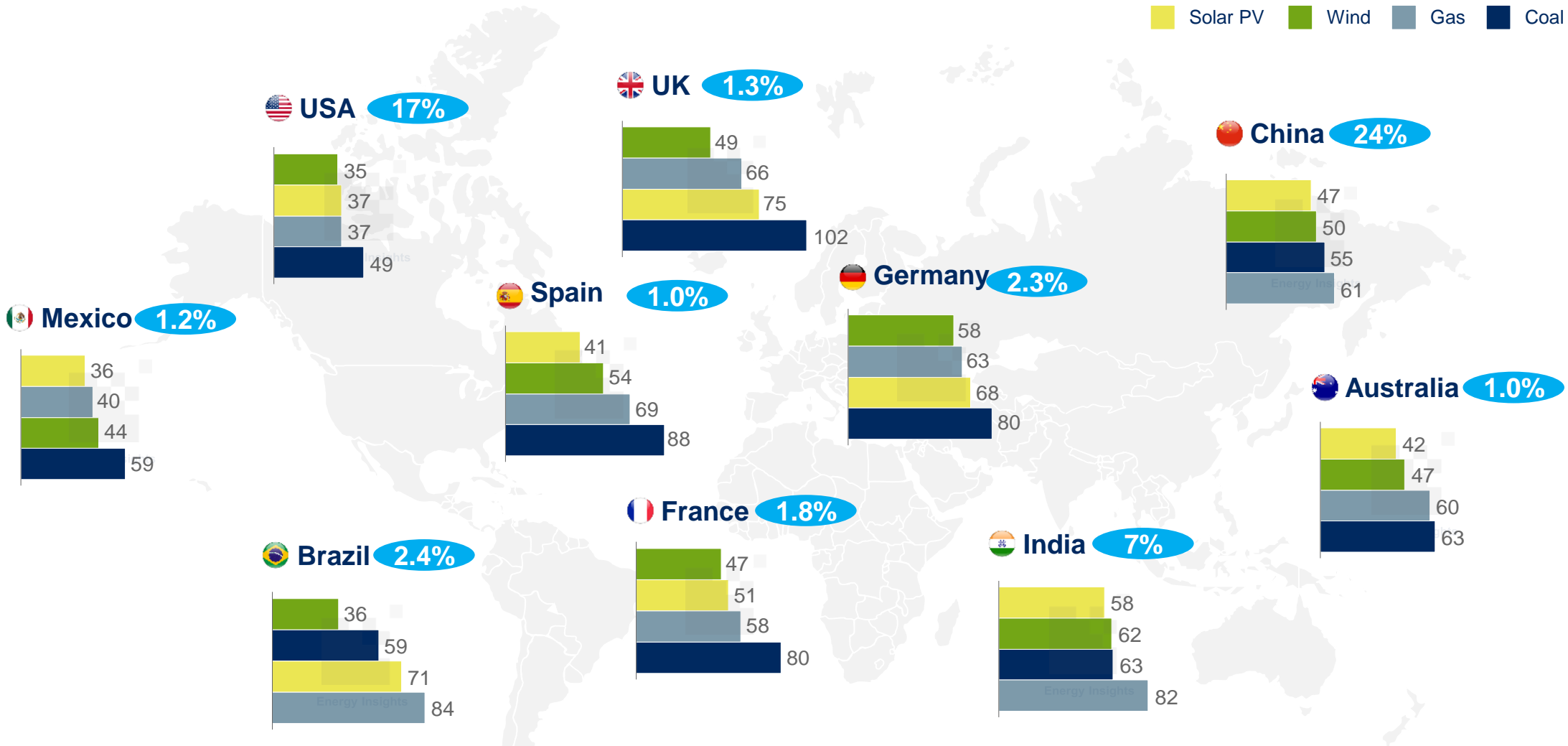
**3.  
Renewables' cost  
decline accelerates  
further, out-competing  
new-built fossil  
capacity today and  
existing capacity in  
5-10 years**



# This is driven by rapidly improving economics of renewables: already in 2020, they are the most economic new-build option across regions

Share global electricity demand

Most economical new-build LCOE, 2020, USD/MWh

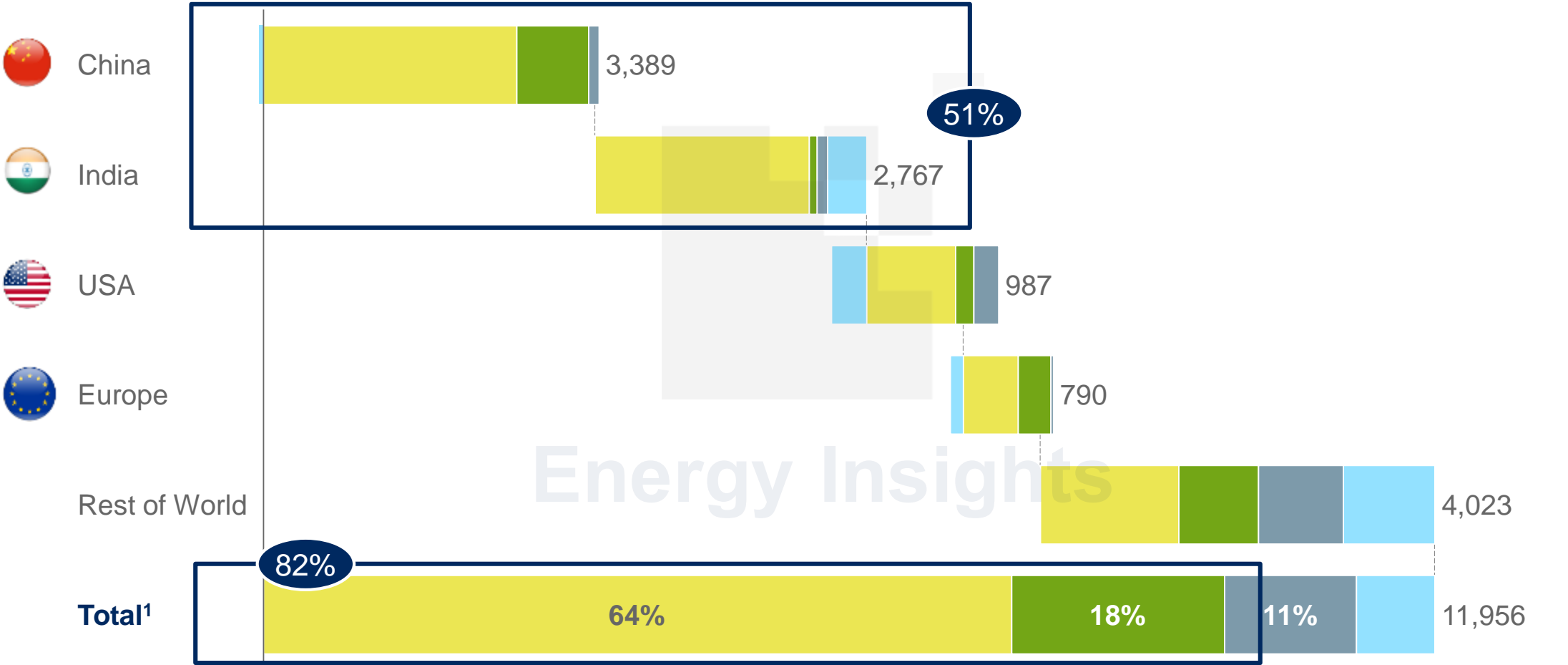


SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017

Globally, more than 80% of capacity additions will be in solar and wind, with China and India contributing more than half

Net global power generation capacity additions, 2015-50, GW

Solar PV Wind Gas Other

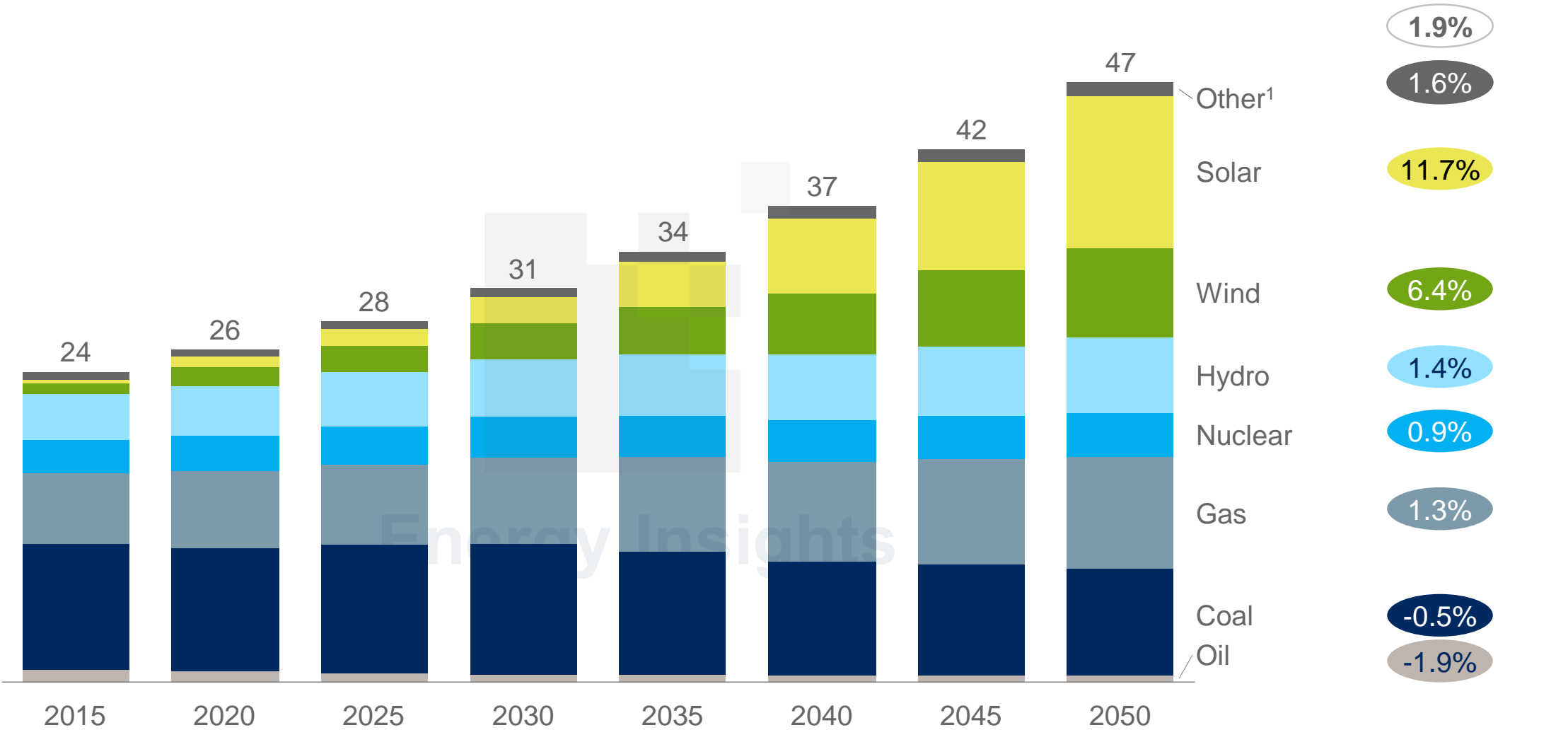


SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017

# Solar and wind generation grow 5-10 times faster than gas, and coal declines after 2030

Global power generation, Thousand TWh

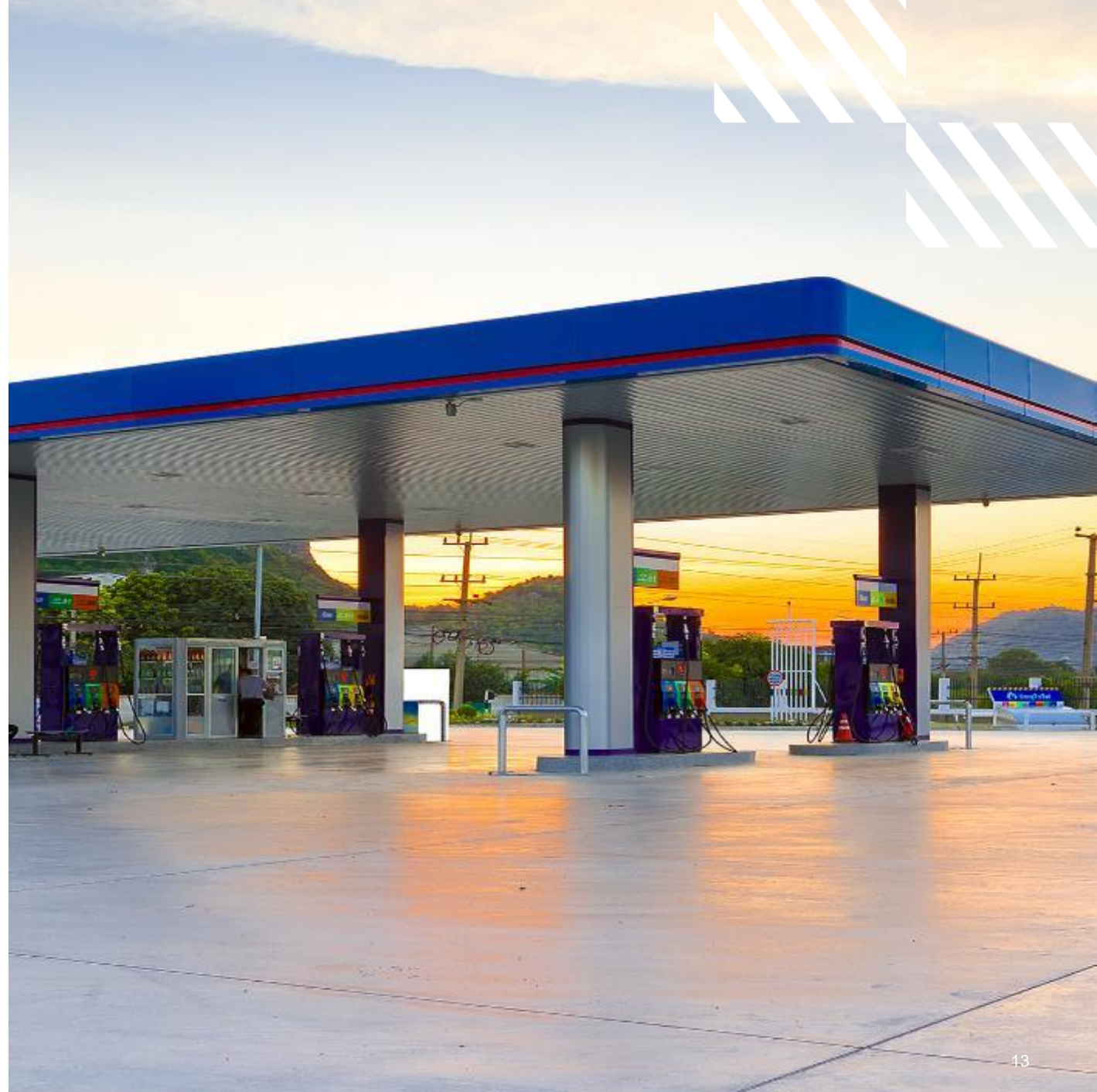
CAGR 2015-50, %



<sup>1</sup> Other includes biomass, geothermal and marine

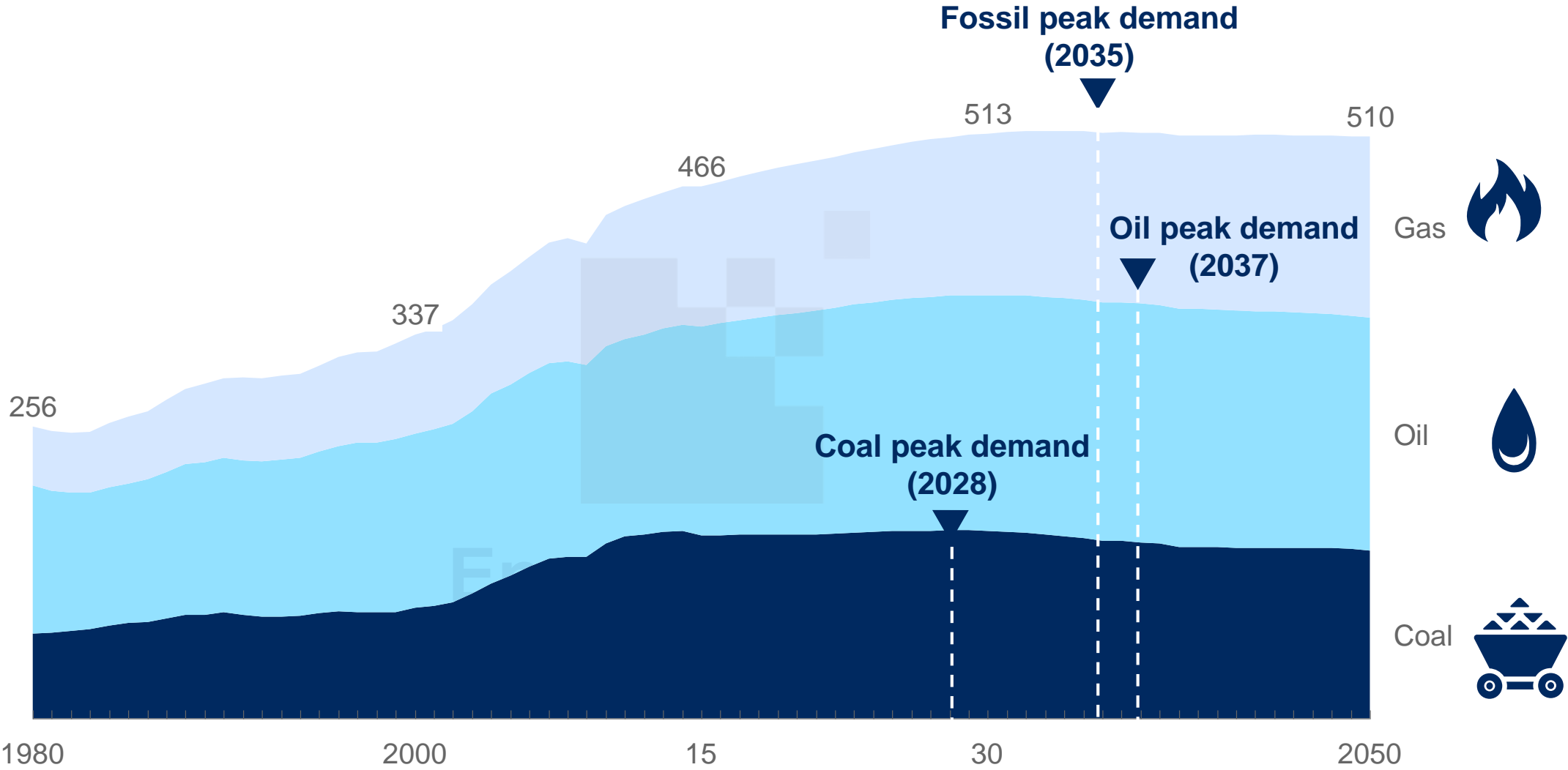
SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017

**4.  
Coal demand peaks in  
next decade, oil in the  
next two; in contrast,  
gas continues to grow  
modestly**



# Fossil fuel use flattens from 2035, with oil and coal in decline but gas use continuing to expand

Global fossil fuel demand, Million TJ

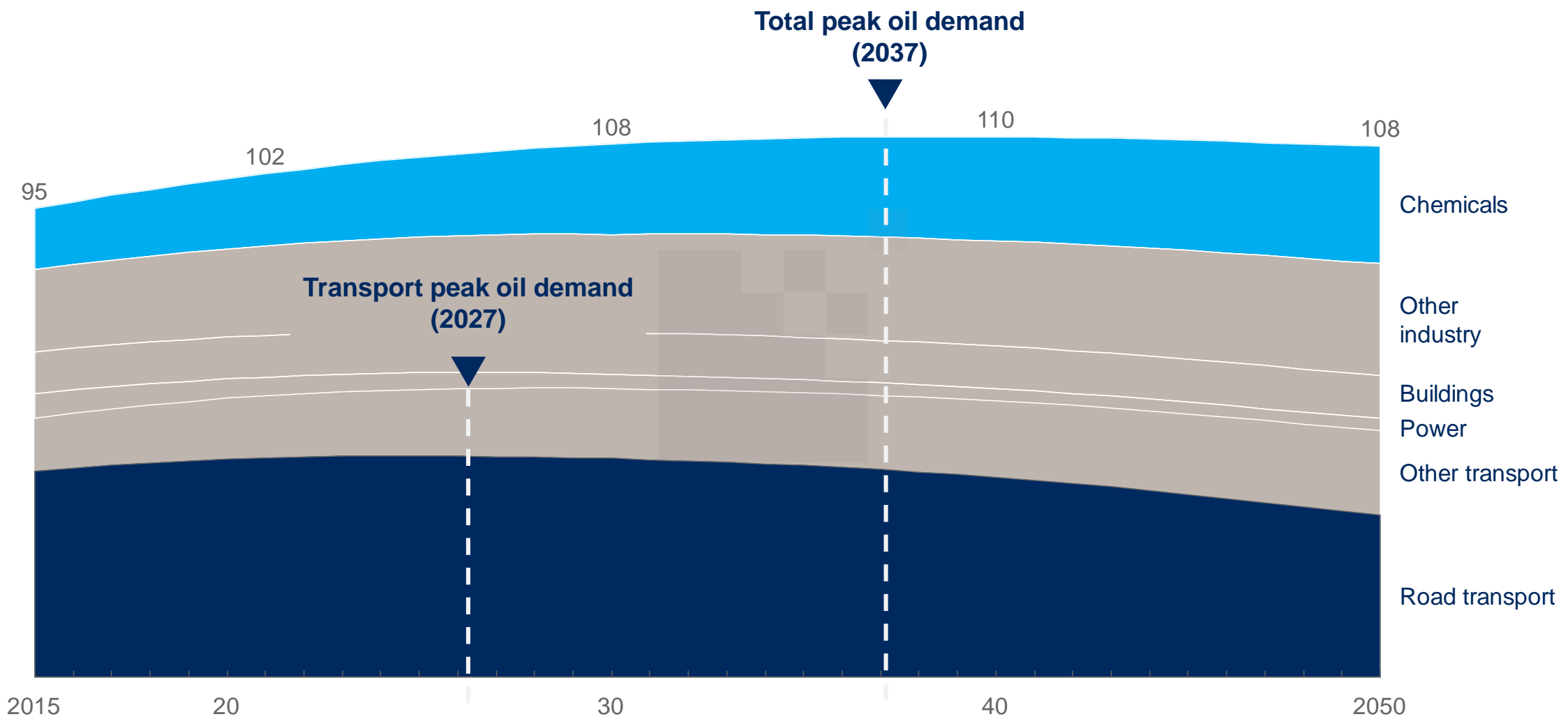


SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017; IEA Energy Balances (Historical)



# Yet, this growth is finite: Peak oil demand is reached before 2040, driven by efficiency improvements and electrification in road transport

Liquids demand, Million barrels per day

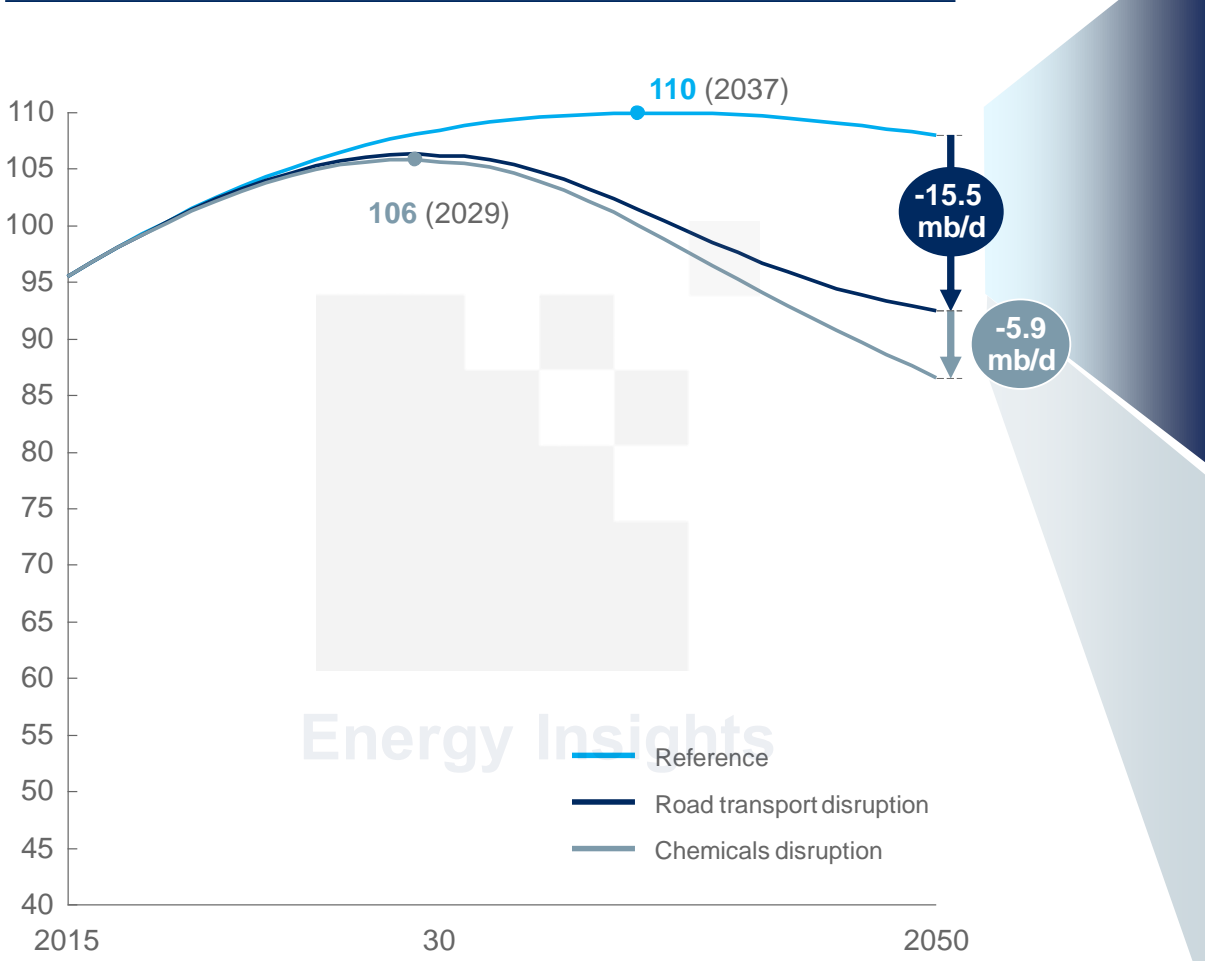


SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017



# With disruption in road transport and chemicals, oil demand could peak before 2030

### Global liquids demand, Million barrels per day



**Road transport**

**Chemicals**

Reference case Additional with disruption

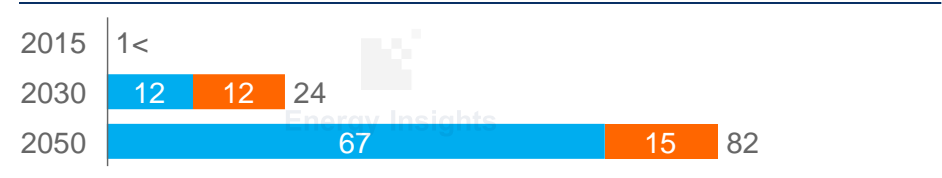
### EV passenger car penetration

EVs as % of global new passenger car sales



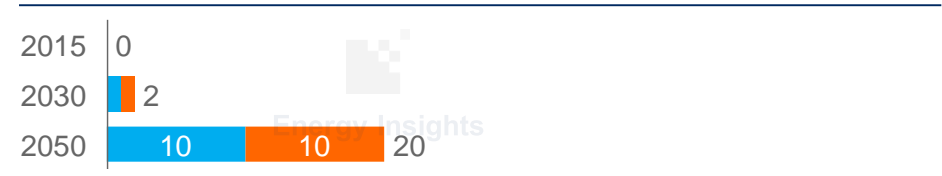
### EV commercial vehicle penetration

EVs as % of global new truck sales



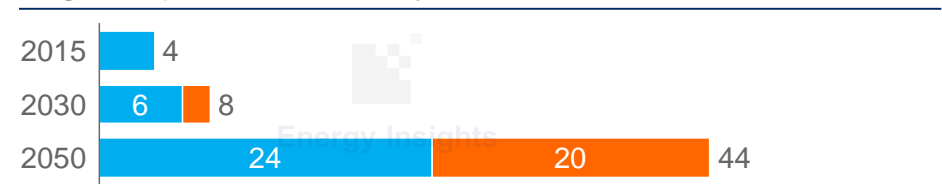
### Efficient packaging

% reduction in global plastics use relative to 2015 practices



### Plastics recycling

% global plastics from recycled feedstock



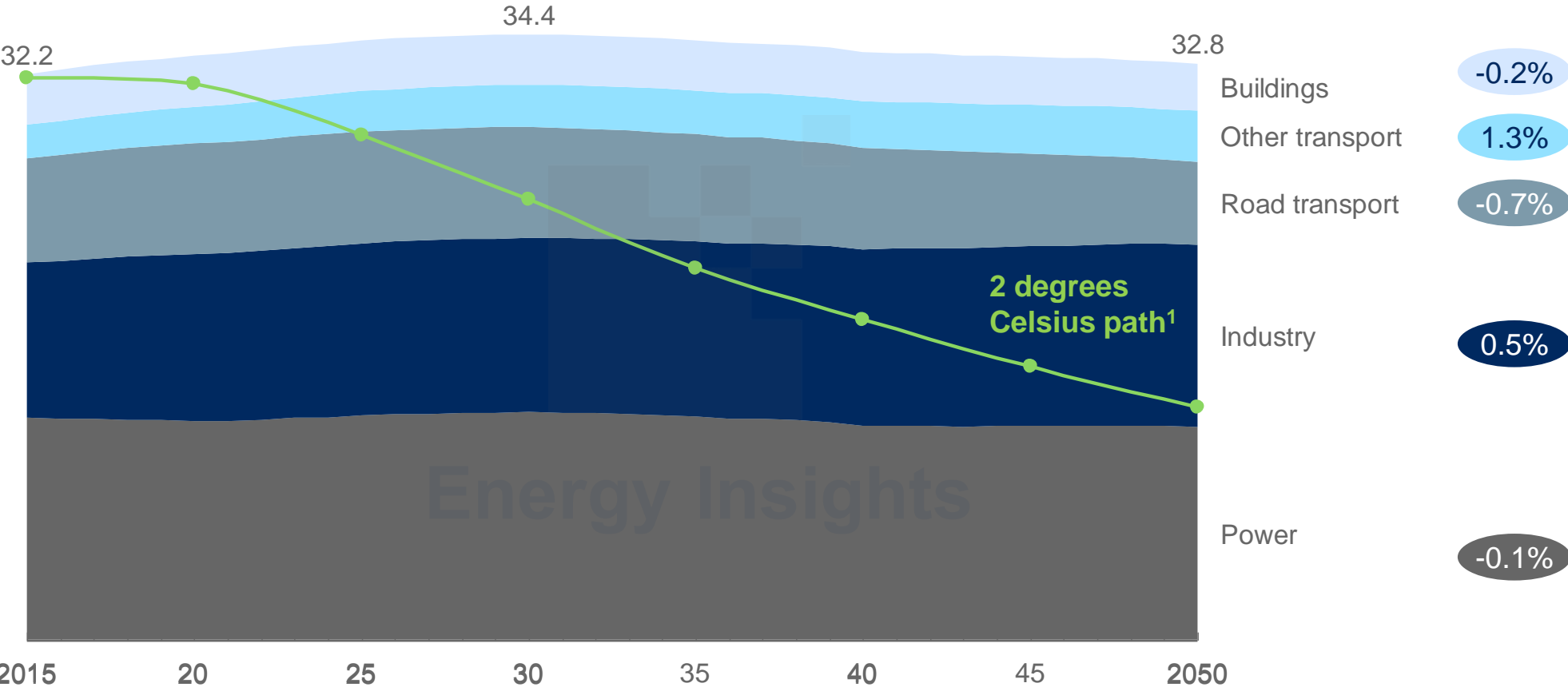


**5.  
Plateau in CO2  
emissions by 2030 is  
insufficient to meet a  
2 degrees Celsius  
pathway**



# Energy-related CO<sub>2</sub> emissions peak around 2030 but remain more than double the level consistent with a 2 degrees Celsius long-term pathway

Energy-related CO<sub>2</sub> emissions by sector<sup>1</sup>, Gigatonnes CO<sub>2</sub>-equivalent



<sup>1</sup> IEA Sustainable Development Scenario emissions pathway consistent with a 1.5-2 degrees Celsius long-term global average temperature increase; extrapolated for 2040-50

SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017; IEA World Energy Outlook 2017 (Sustainable Development Scenario)

## 6. Implications



## In summary..

1



**Global energy demand growth decelerates**, following a structural decline in energy intensity

2



**Electricity demand grows 4 times faster** than all other fuels

3



**Renewables' cost decline accelerates further**, out-competing new-built fossil capacity today and existing capacity in 5-10 years

4



**Coal demand peaks in next decade, oil in the next two**; in contrast, gas continues to grow modestly

5



**Plateau in CO<sub>2</sub> emissions by 2030 is insufficient** to meet a 2 degrees Celsius pathway

# Observations for CAREC 2030

## **Emergence of new energy trade patterns**

- On global level, fossil fuels expected to grow till 2035 and plateau afterwards – new winners and losers
- Key players for the region will develop differently - e.g. China, Russia and India
- Implications for regional grids and transport network - rail and road corridors

## **The impact of energy transition on CAREC economies brings opportunities and challenges**

- Strategic choices to be made about investing in EV and renewable energy, especially for fuel importers
- Opportunity for accelerated off-grid electrification and risk of stranded assets
- Changing energy mix will require new jobs but will also disrupt existing sectors

## **Policy makers play a crucial role to shape the region's changing future**

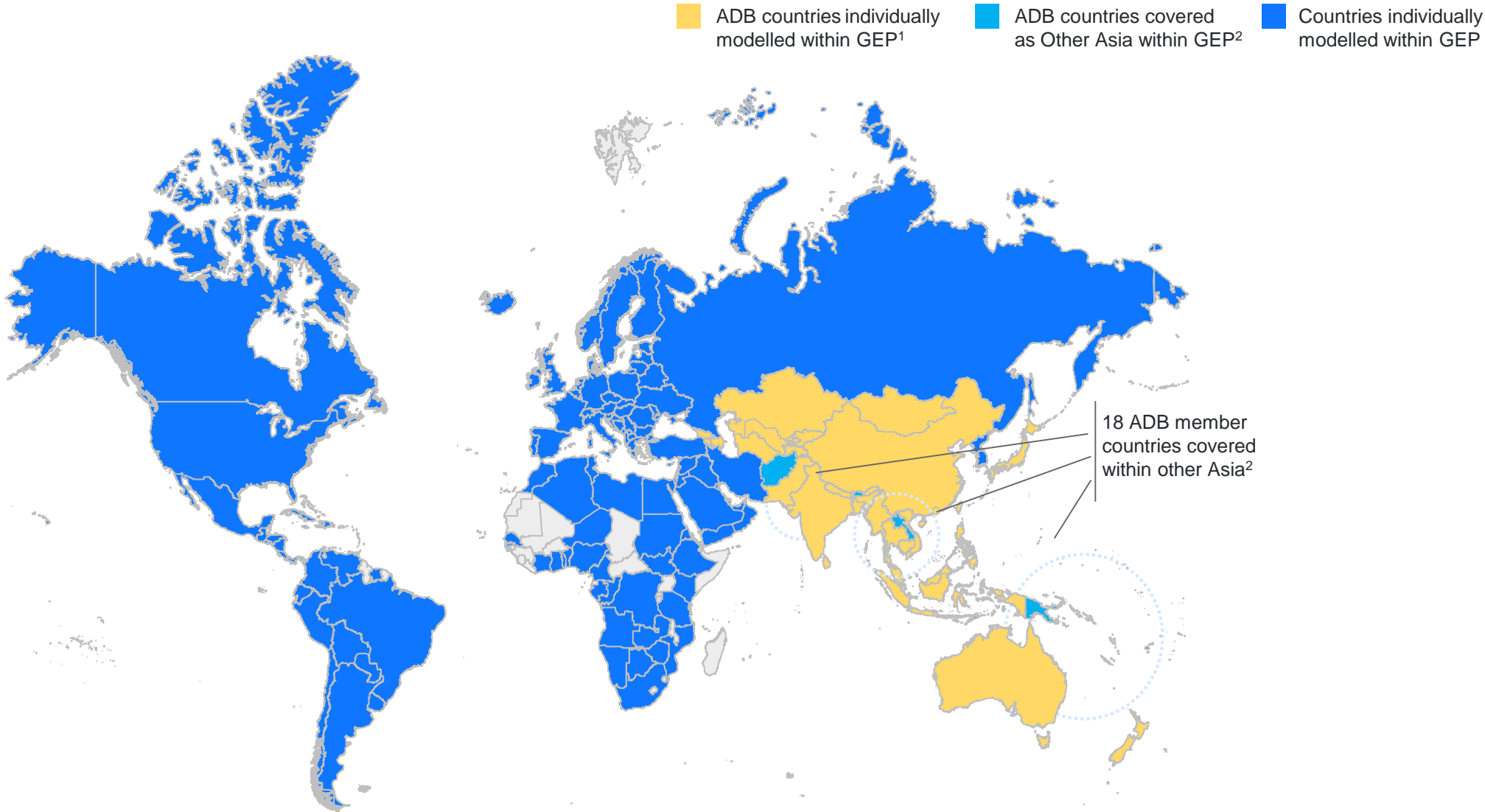
- Commitment to lowering emissions and develop new industries
- Policy plays a pivotal role and can push or delay new technologies in favor/despite learning curves
- More disruptive scenarios bring dramatic shifts – current leaders may not be leaders in the future



# Energy Insights

By McKinsey

# GEP has global coverage, including details on 30 countries in ADB membership



1 Includes: Armenia, Australia, Azerbaijan, Bangladesh, Brunei, Cambodia, China, Georgia, Hong Kong, India, Indonesia, Japan, Kazakhstan, South Korea, Kyrgyz Republic, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Viet Nam  
 2 Remaining 18 ADB countries included in "Other Asia" are Afghanistan, Bhutan, Cook Islands, Fiji, Kiribati, Lao PDR, Maldives, Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu

## ADB regional programs and countries

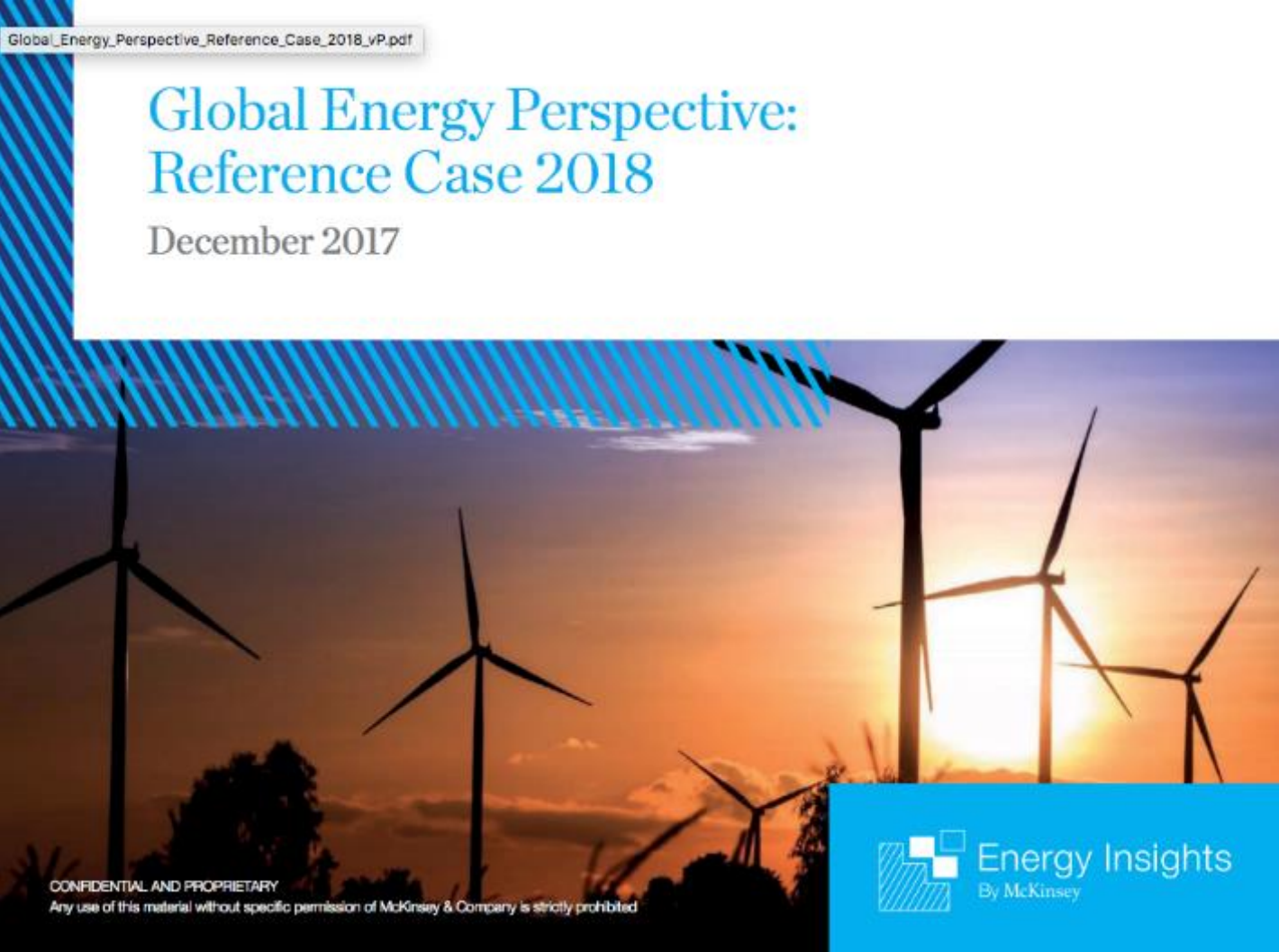
<b>BIMP-East Asian Growth Area (BIMP-EAGA)</b>	<b>Central Asian Regional Economic Cooperation (CAREC)</b>	<b>IMT-Growth Triangle (IMT-GT)</b>	<b>South Asia Subregional Economic Cooperation (SASEC)</b>	<b>Greater Mekong Subregion (GMS)</b>
<ul style="list-style-type: none"> <li>▪ Brunei Darussalam</li> <li>▪ Indonesia</li> <li>▪ Malaysia</li> <li>▪ Philippines</li> </ul>	<ul style="list-style-type: none"> <li>▪ Afghanistan</li> <li>▪ Azerbaijan</li> <li>▪ People's Republic of China</li> <li>▪ Georgia</li> <li>▪ Kazakhstan</li> <li>▪ Kyrgyz Republic</li> <li>▪ Mongolia</li> <li>▪ Pakistan</li> <li>▪ Tajikistan</li> <li>▪ Turkmenistan</li> <li>▪ Uzbekistan</li> </ul>	<ul style="list-style-type: none"> <li>▪ Indonesia</li> <li>▪ Malaysia</li> <li>▪ Thailand</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bangladesh</li> <li>▪ Bhutan</li> <li>▪ India</li> <li>▪ Maldives</li> <li>▪ Myanmar</li> <li>▪ Nepal</li> <li>▪ Sri Lanka</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cambodia</li> <li>▪ People's Republic of China<sup>1</sup></li> <li>▪ Lao People's Democratic Republic</li> <li>▪ Myanmar</li> <li>▪ Thailand</li> <li>▪ Viet Nam</li> </ul>

<sup>3</sup> Specifically Yunnan Province and Guangxi Zhuang Autonomous Region

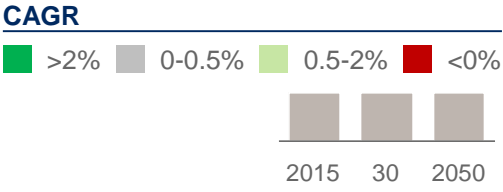


We have released our 2018 Global Energy Perspective Reference Case

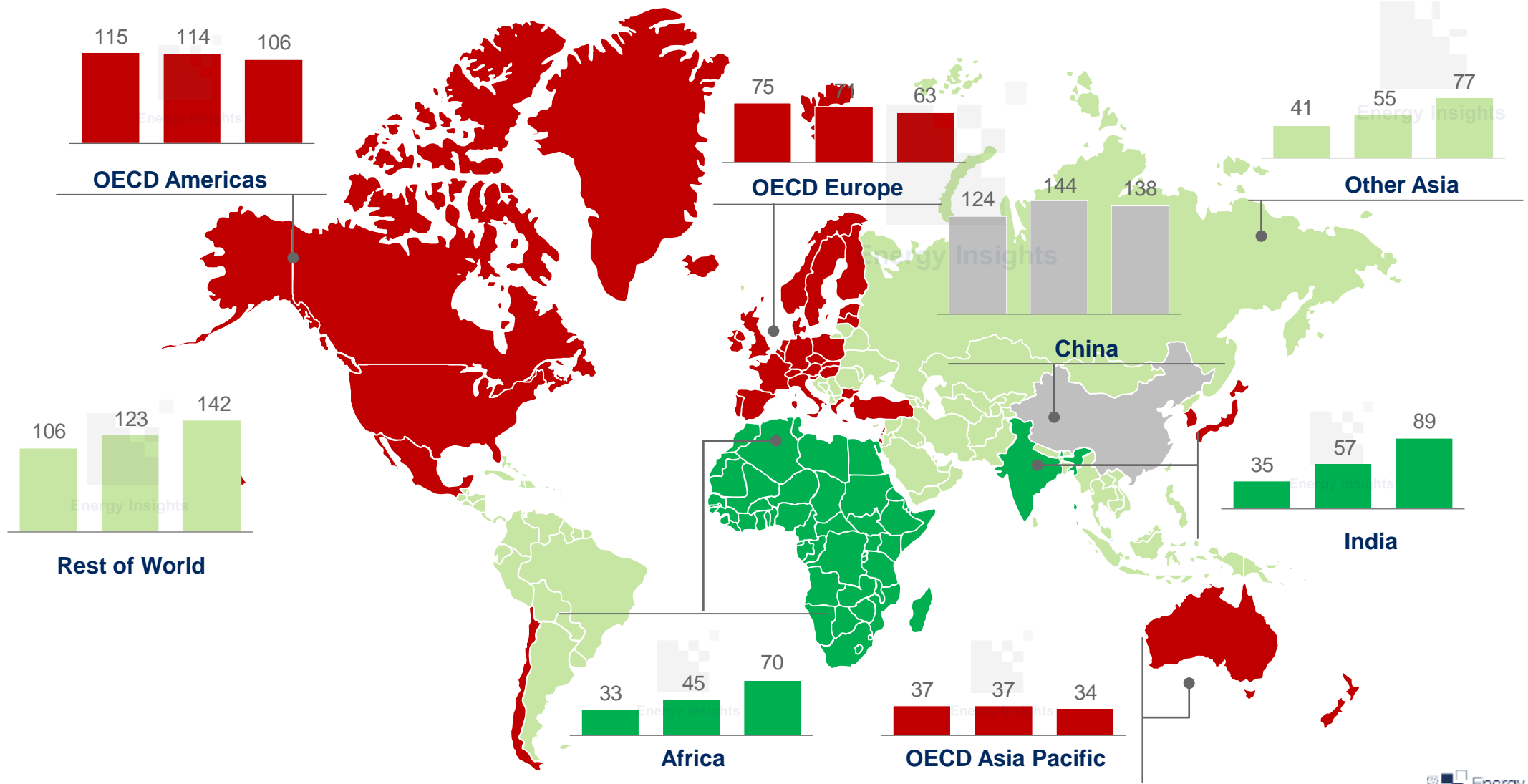
<https://gep.mckinseyenergyinsights.com/>



# India, Africa and other developing Asia lead energy demand growth over 2015-50, while China peaks and OECD markets decline



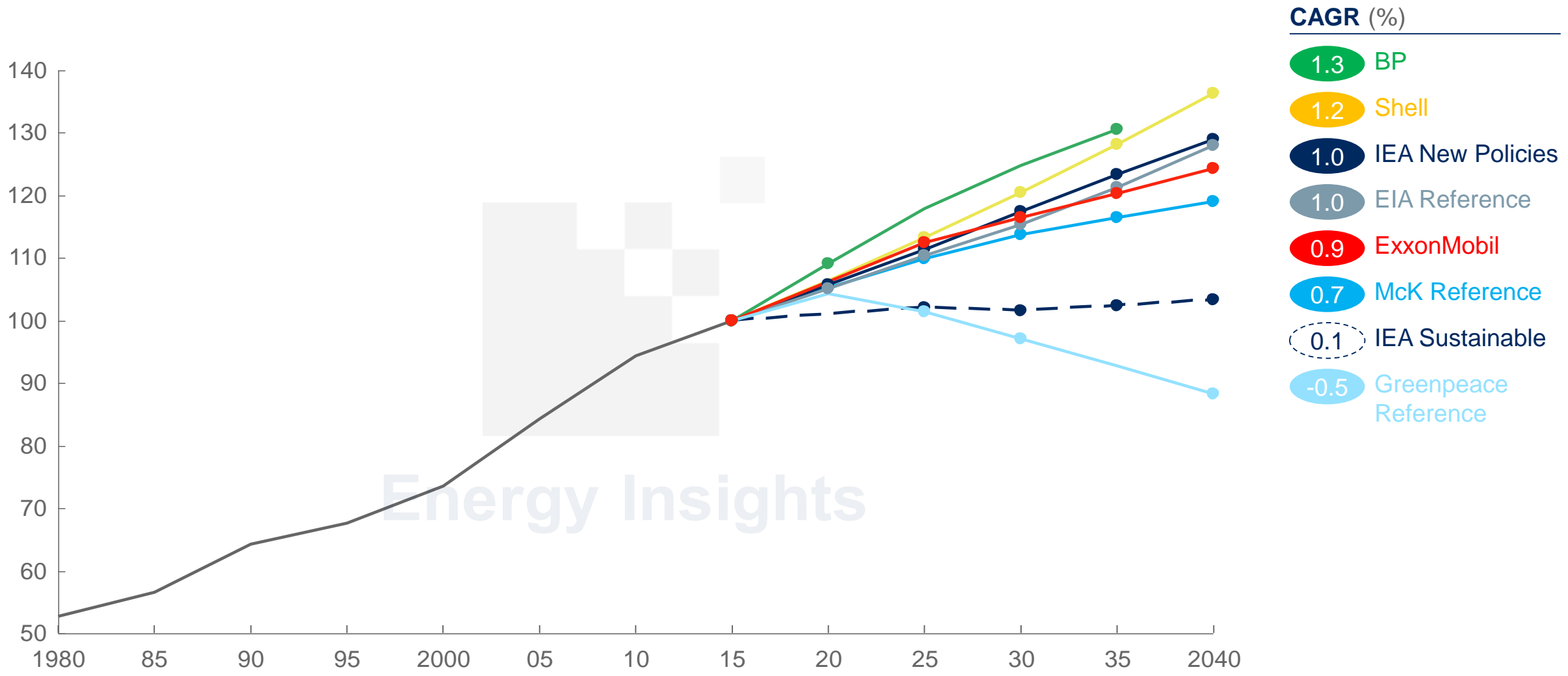
Primary energy demand by region, 2015-50, Million terajoules



SOURCE: McKinsey Energy Insights' Global Energy Perspective, December 2017

# The McKinsey Global Energy Perspective Reference Case projects slower energy demand growth than comparable long-term energy outlooks

Primary energy demand, 2015=100



SOURCES: McKinsey Energy Insights' Global Energy Perspective, December 2017; BP Energy Outlook 2017; ExxonMobil 2017 Outlook for Energy; IEA WEO 2017; EIA IEO 2017; Shell New Lens Scenarios