

# International Energy Outlook 2016



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*For*

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*By*

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# Global outlook

## Key findings in the IEO2016 Reference case

- World energy consumption increases from 549 quadrillion Btu in 2012 to 629 quadrillion Btu in 2020 and then to 815 quadrillion Btu in 2040, a 48% increase (1.4%/year). Non-OECD Asia (including China and India) account for more than half of the increase.
- The industrial sector continues to account for the largest share of delivered energy consumption; the world industrial sector still consumes over half of global delivered energy in 2040.
- Renewable energy is the world's fastest-growing energy source, increasing by 2.6%/year; nuclear energy grows by 2.3%/year, from 4% of the global total in 2012 to 6% in 2040.
- Fossil fuels continue to supply more than three-fourths of world energy use in 2040.

## Key findings in the IEO2016 Reference case (continued)

- Among the fossil fuels, natural gas grows the fastest. Coal use plateaus in the mid-term as China shifts from energy-intensive industries to services and worldwide policies to limit coal use intensify. By 2030, natural gas surpasses coal as the world's second largest energy source.
- In 2012, coal provided 40% of the world's total net electricity generation. By 2040, coal, natural gas, and renewable energy sources provide roughly equal shares (28-29%) of world generation.
- With current policies and regulations, worldwide energy-related carbon dioxide emissions rise from about 32 billion metric tons in 2012 to 36 billion metric tons in 2020 and then to 43 billion metric tons in 2040, a 34% increase.

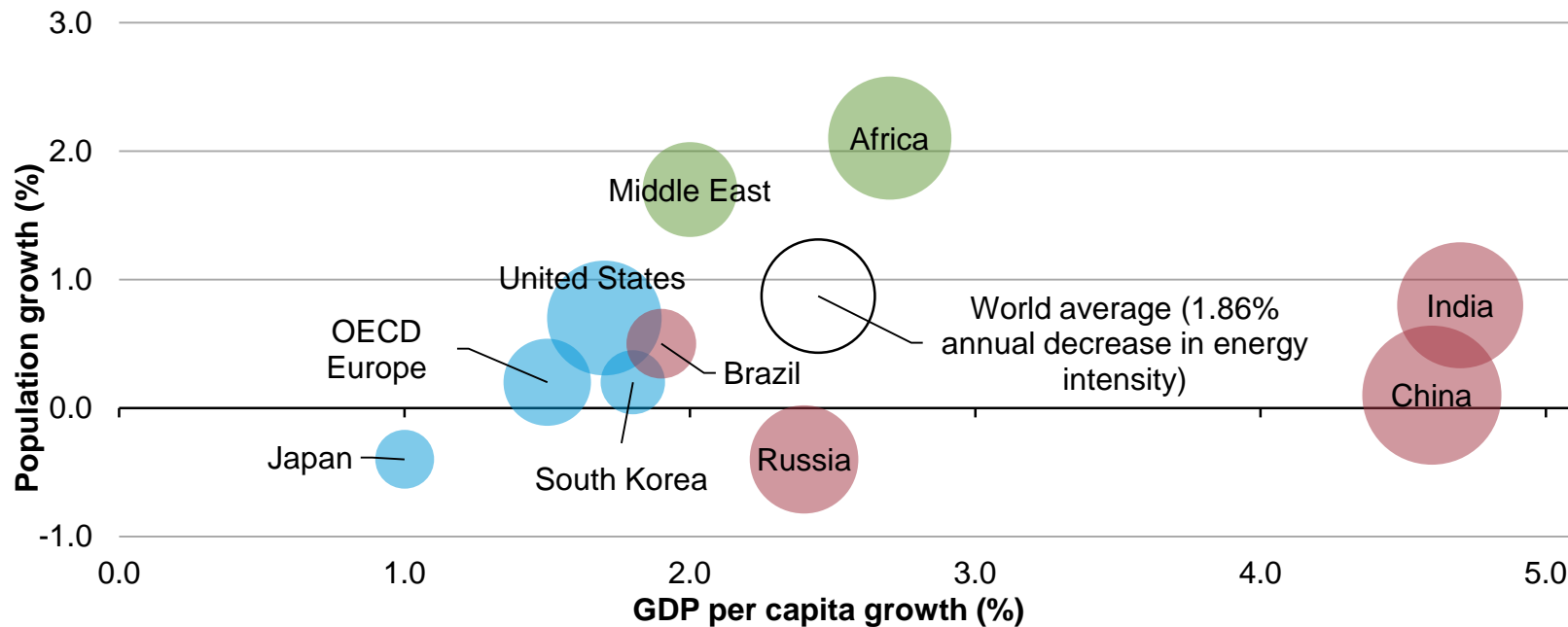
## Many global issues increase uncertainty...

- Economic growth in key economies (China, Brazil, Russia, among others)
- Implementation and strength of climate policies
- Technology improvement rates (both supply and demand)
- Unrest in oil producing countries
- OPEC production
- Future of nuclear generating capacity

# Economic activity and population drive increases in energy use; energy intensity (E/GDP) improvements moderate this trend

average annual percent change (2012–40)

percent per year

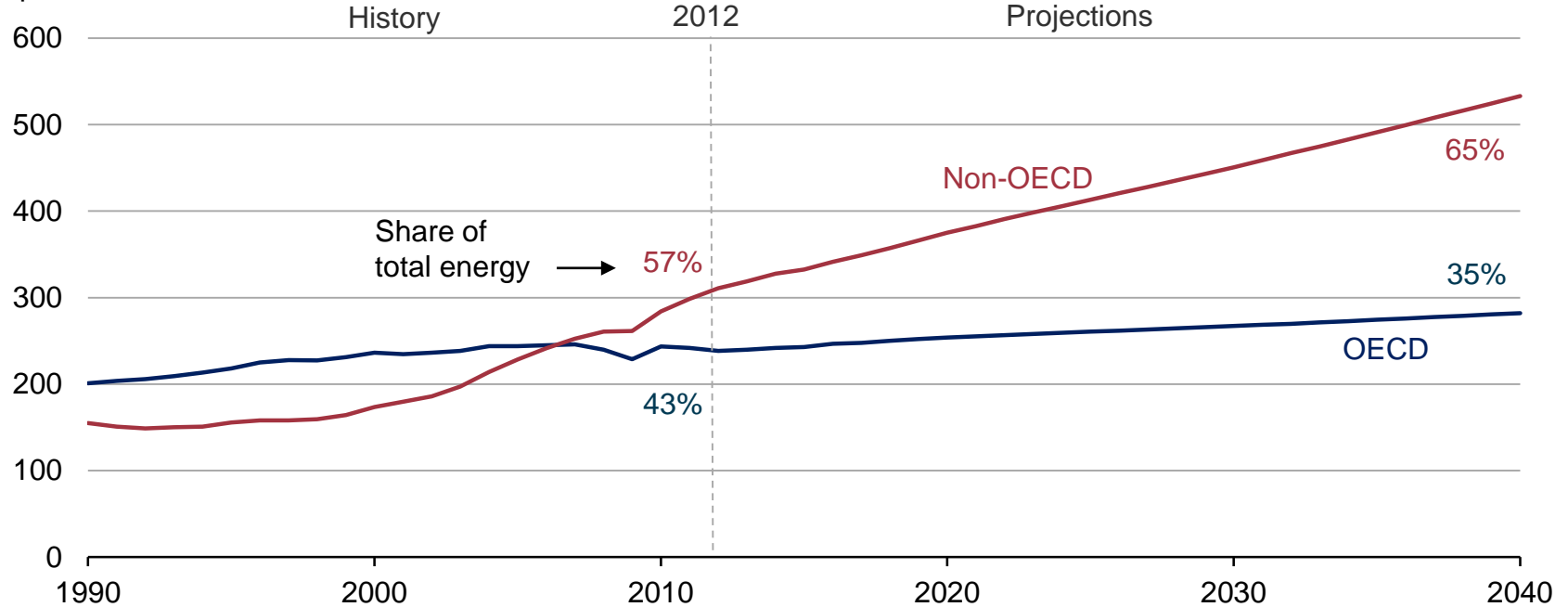


Source: EIA, International Energy Outlook 2016

# Non-OECD nations drive the increase in total energy use

world energy consumption

quadrillion Btu

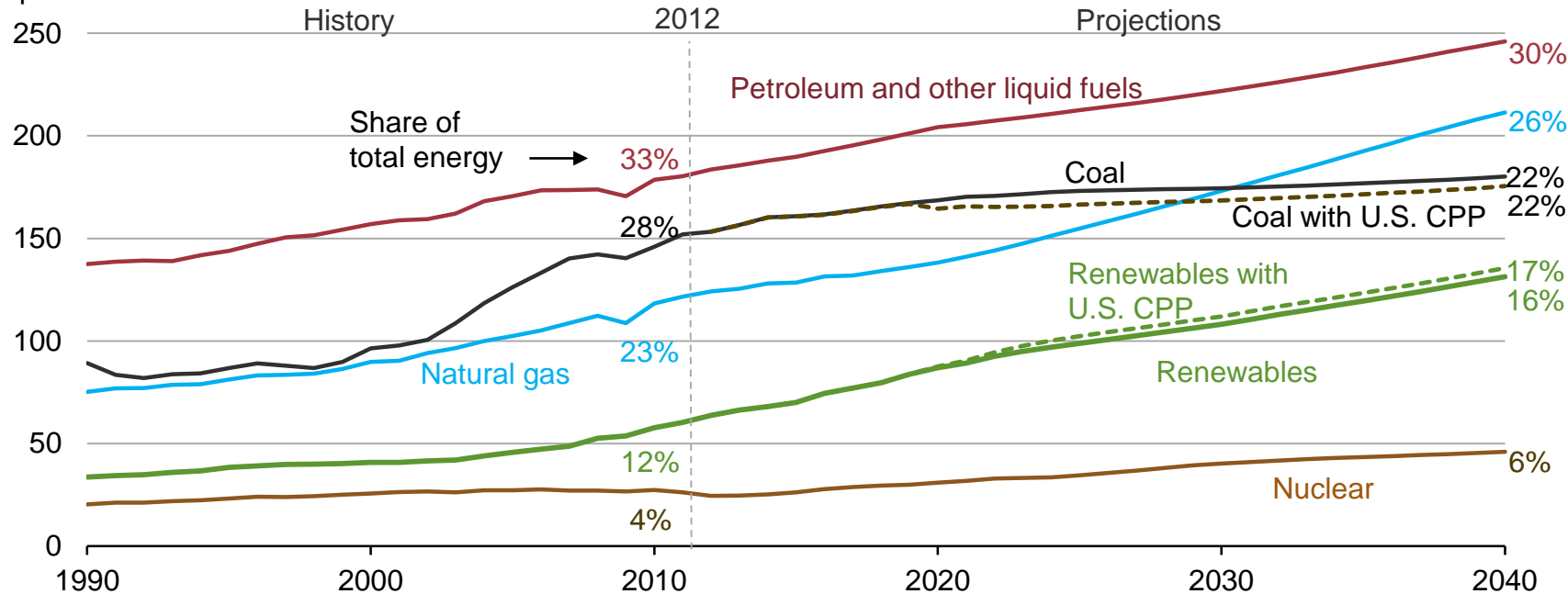


Source: EIA, International Energy Outlook 2016

# Renewables grow fastest, coal use plateaus, natural gas surpasses coal by 2030, and oil maintains its leading share

world energy consumption

quadrillion Btu

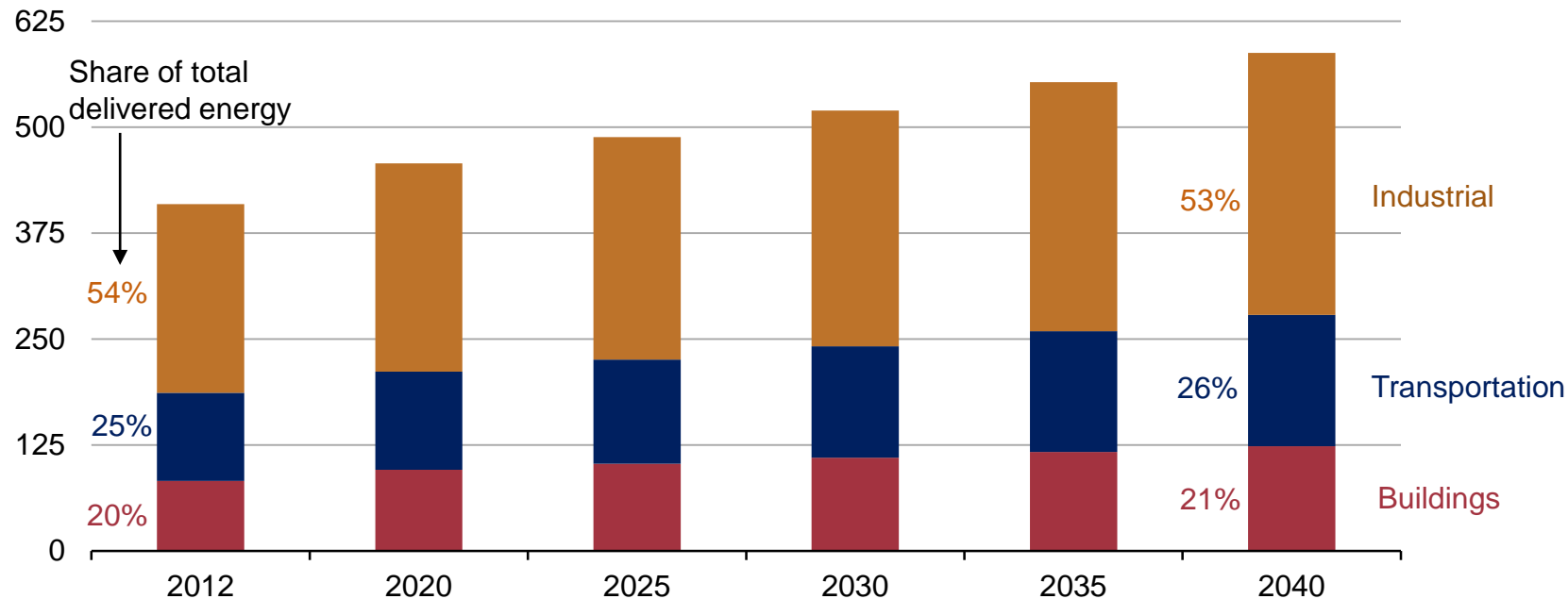


Source: EIA, International Energy Outlook 2016 and EIA, Analysis of the Impacts of the Clean Power Plan (May 2015)



# As total energy consumption grows, shares by end-use sector remain relatively unchanged

world delivered energy consumption by end-use sector  
quadrillion Btu

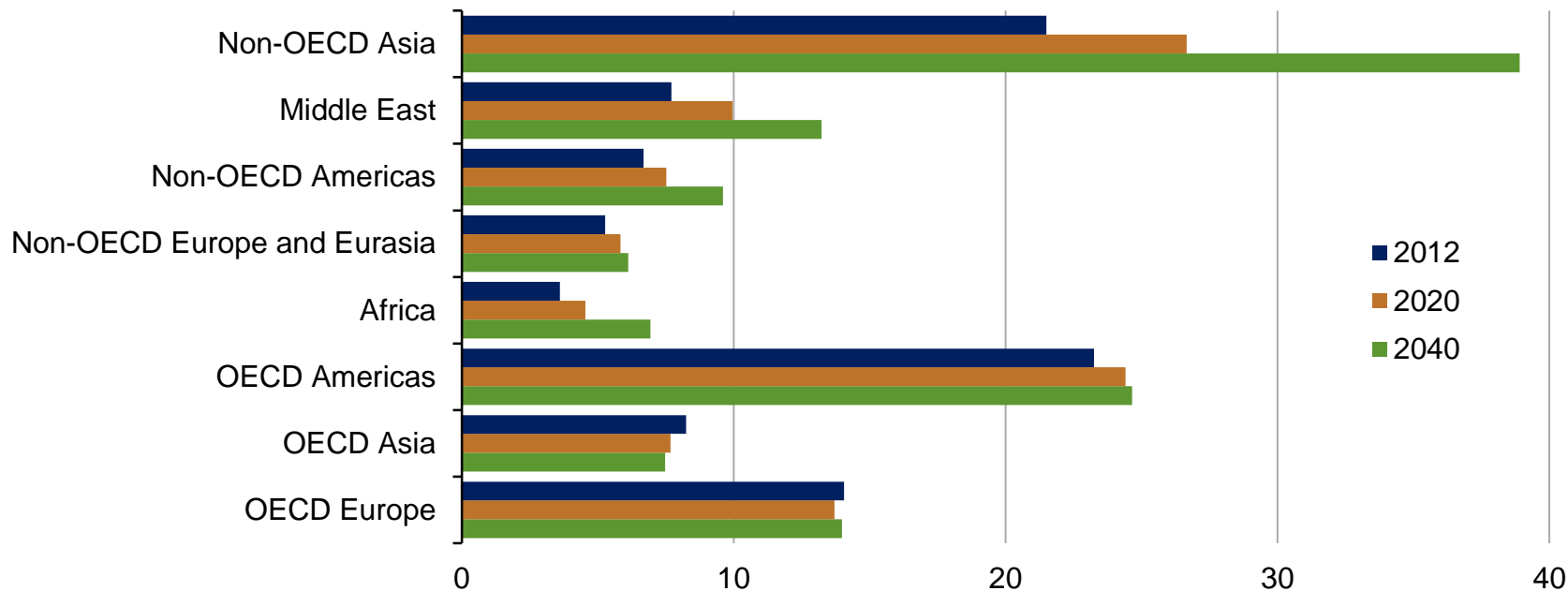


Source: EIA, International Energy Outlook 2016

# Liquid fuels markets

# Most of the growth in world oil consumption occurs in the non-OECD regions — especially Asia

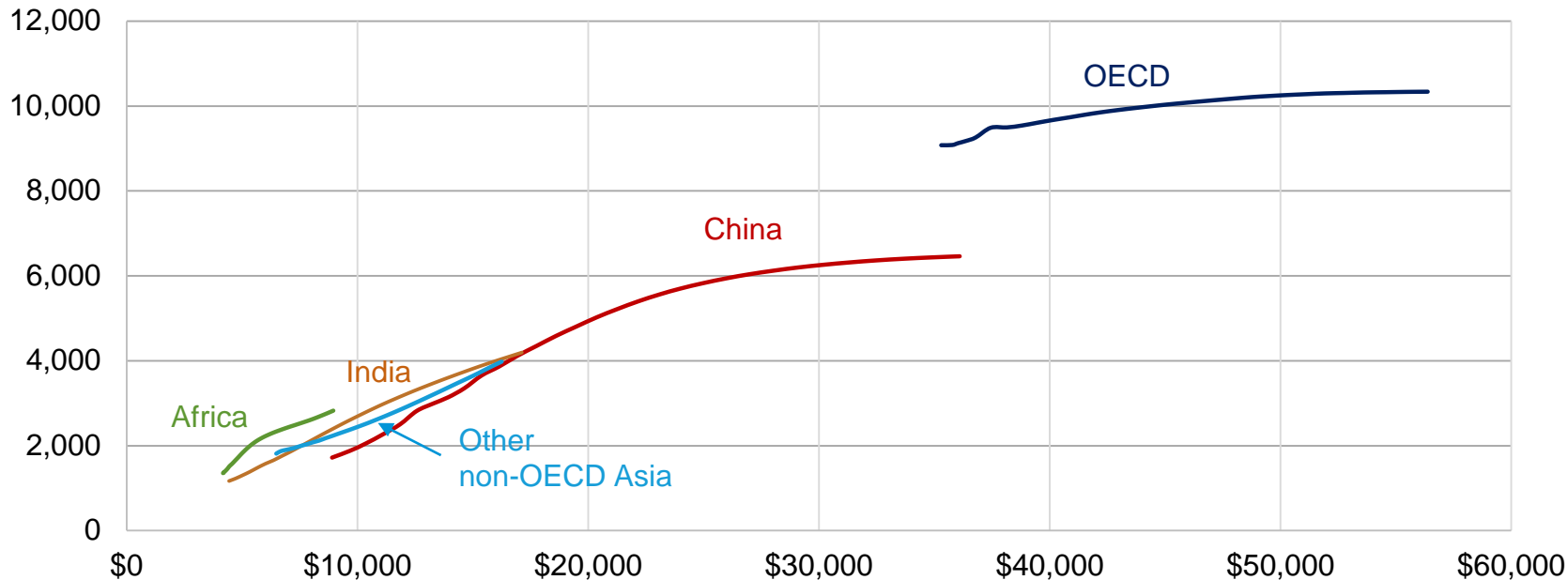
world petroleum and other liquid fuels consumption  
million barrels per day



Source: EIA, *International Energy Outlook 2016*

# Passenger-miles per person will rise as GDP per capita grows; travel growth is largely outside the OECD

passenger-miles per capita (left-axis) and GDP per capita (horizontal-axis) for selected country groupings 2010–40

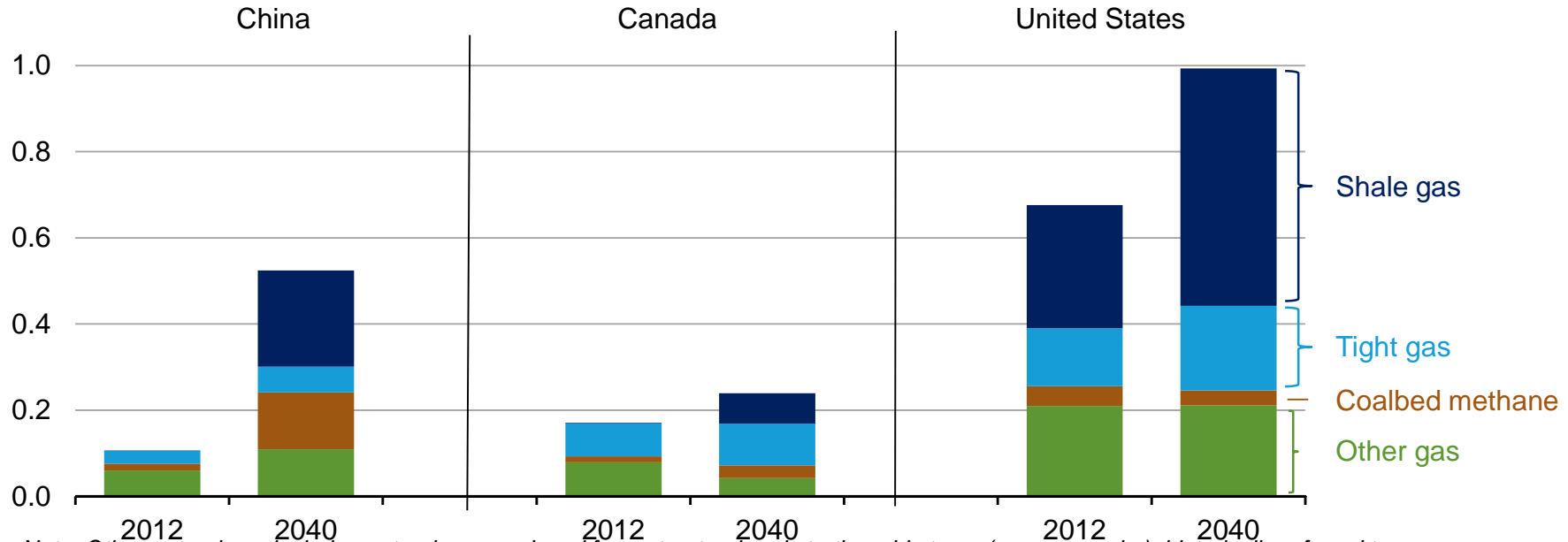


Source: EIA, *International Energy Outlook 2016*

# Natural gas markets

# Shale gas, tight gas, and coalbed methane will become increasingly important to gas supplies, not only for the U.S., but also China and Canada

natural gas production by type  
trillion cubic meters

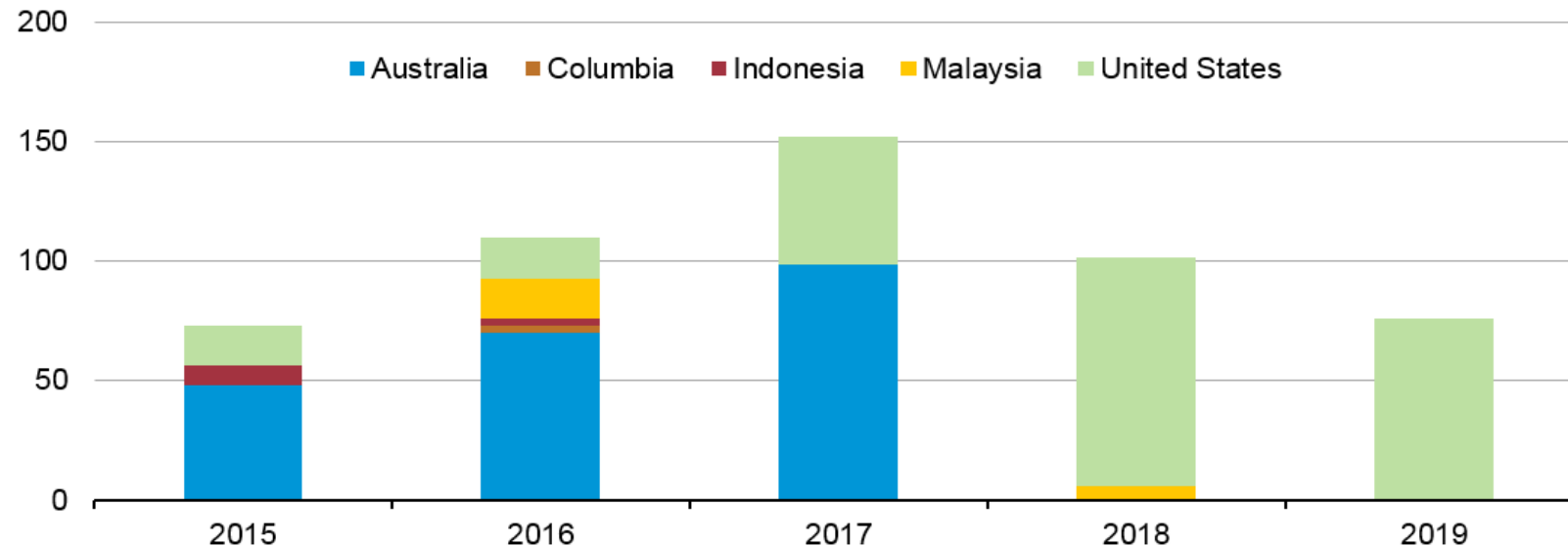


Note: Other natural gas includes natural gas produced from structural and stratigraphic traps (e.g. reservoirs), historically referred to as 'conventional' production.

Source: EIA, International Energy Outlook 2016

# Liquefaction capacity additions over the 2015-19 time period will increase global capacity by over 30%

LNG capacity additions  
million cubic meters per day



*Note: Capacity additions in 2015-19 include projects currently under construction, and represent nameplate capacity, not adjusted for ramp-up*

*Source: U.S. Energy Information Administration estimates based on trade press*

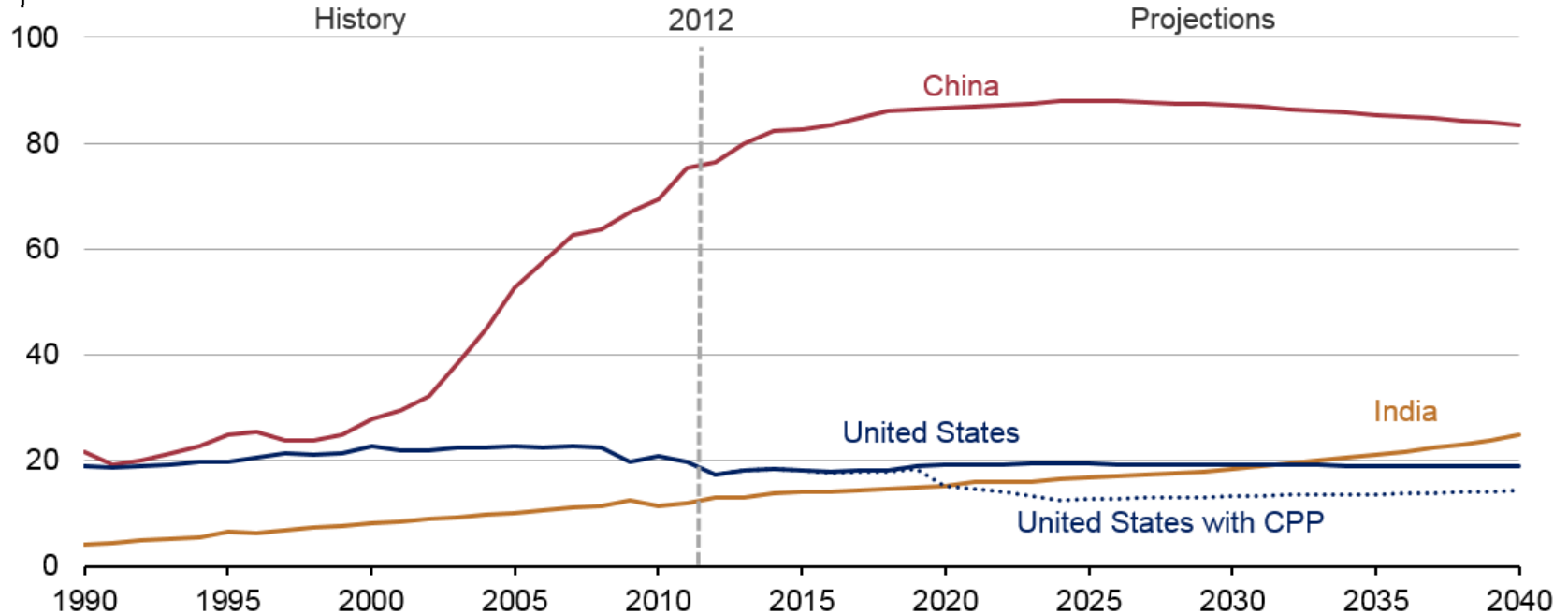
# Electricity markets



# Of the world's three largest coal consumers, only India is projected to continue to increase throughout the projection

coal consumption in the US, China, and India

quadrillion Btu

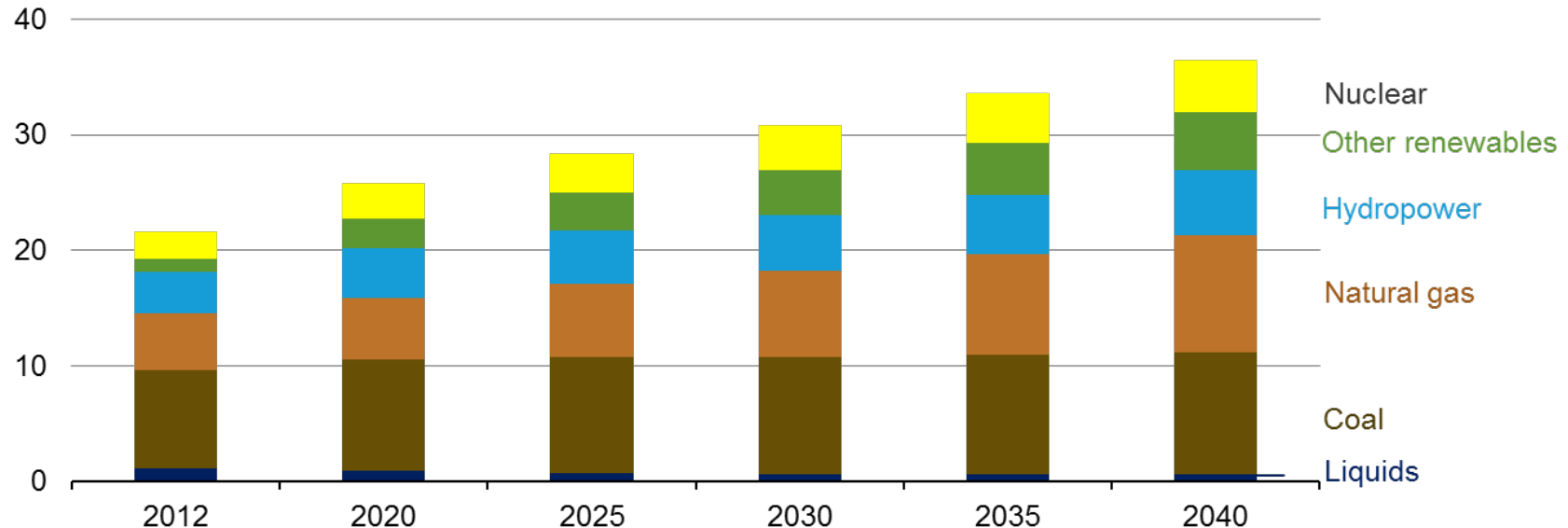


Source: EIA, International Energy Outlook 2016 and EIA, Analysis of the Impacts of the Clean Power Plan (May 2015)

# Renewables, natural gas, and coal all contribute roughly the same amount of global net electricity generation in 2040

world net electricity generation by source

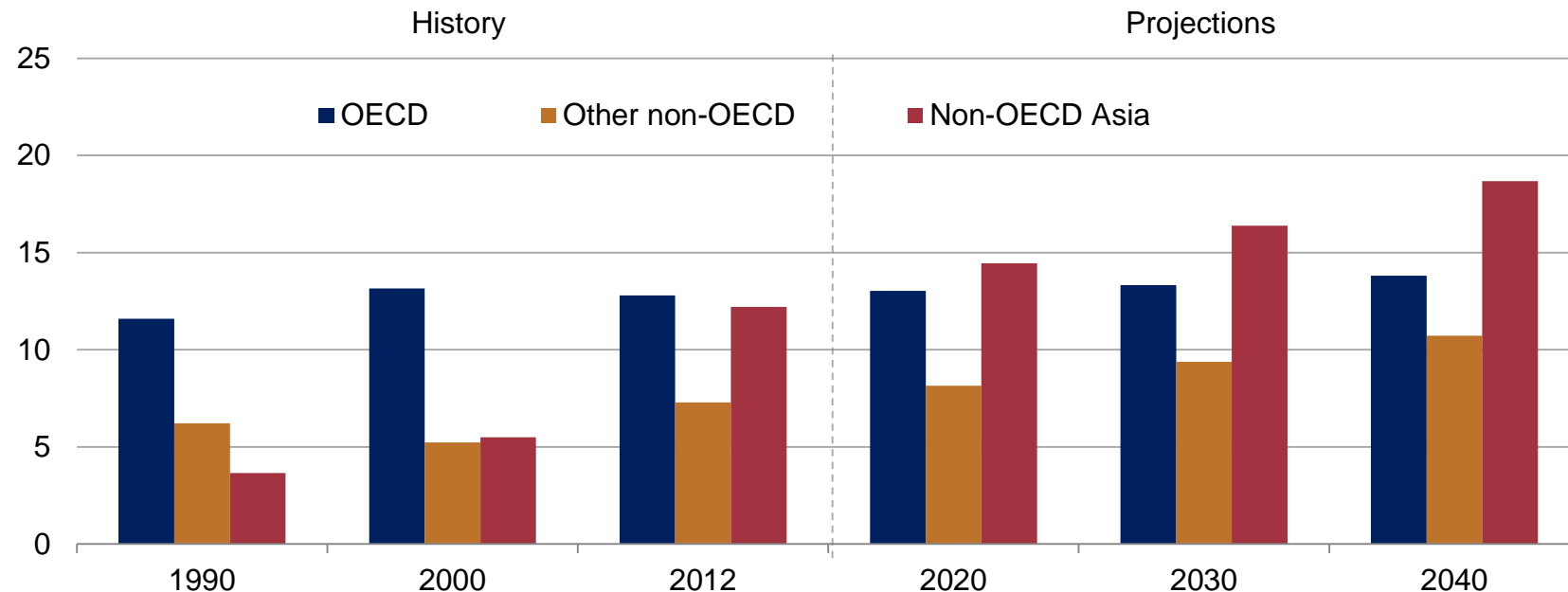
trillion kilowatthours



Source: EIA, International Energy Outlook 2016

# Non-OECD Asia will account for about 60% of the world increase in energy-related CO2 emissions

world energy-related carbon dioxide emissions  
billion metric tons



Source: EIA, International Energy Outlook 2016

# For more information

U.S. Energy Information Administration home page | [www.eia.gov](http://www.eia.gov)

Annual Energy Outlook | [www.eia.gov/aeo](http://www.eia.gov/aeo)

Short-Term Energy Outlook | [www.eia.gov/steo](http://www.eia.gov/steo)

International Energy Outlook | [www.eia.gov/ieo](http://www.eia.gov/ieo)

Monthly Energy Review | [www.eia.gov/mer](http://www.eia.gov/mer)

Today in Energy | [www.eia.gov/todayinenergy](http://www.eia.gov/todayinenergy)

State Energy Profiles | [www.eia.gov/state](http://www.eia.gov/state)

Drilling Productivity Report | [www.eia.gov/petroleum/drilling/](http://www.eia.gov/petroleum/drilling/)

International Energy Portal | [www.eia.gov/beta/international/?src=home-b1](http://www.eia.gov/beta/international/?src=home-b1)