

International Energy Outlook 2013: Projections to 2040



for

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by

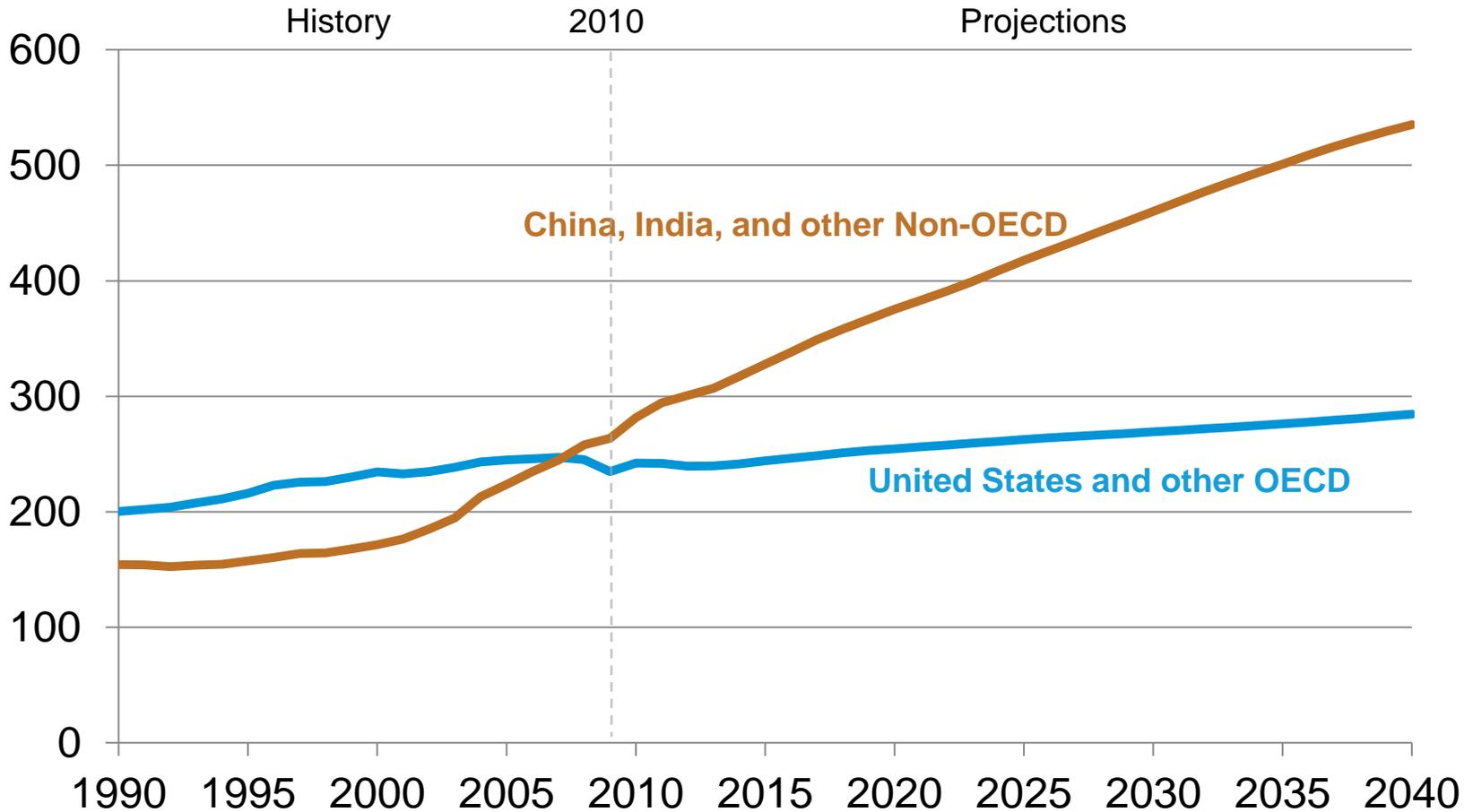
Adam Sieminski, Administrator

Key findings of *International Energy Outlook 2013*

- World energy consumption is projected to increase 56% between 2010 and 2040. Half of the increase is attributed to China and India. U.S. consumption grows by less than 10%.
- Renewable energy and nuclear power are the world's fastest-growing energy sources, but fossil fuels continue to supply almost 80% of total world and U.S. energy consumption through 2040.
- Natural gas is the fastest growing fossil fuel in the outlook, supported by increasing supplies of tight gas, shale gas, and coalbed methane, particularly in the United States.
- World coal use continues to grow, mostly due to increases in China's consumption of coal. Petroleum and other liquids fuels grow more slowly.
- Given current policies and regulations, worldwide energy-related carbon dioxide emissions are projected to increase 46% by 2040.

Non-OECD nations drive the increase in energy demand

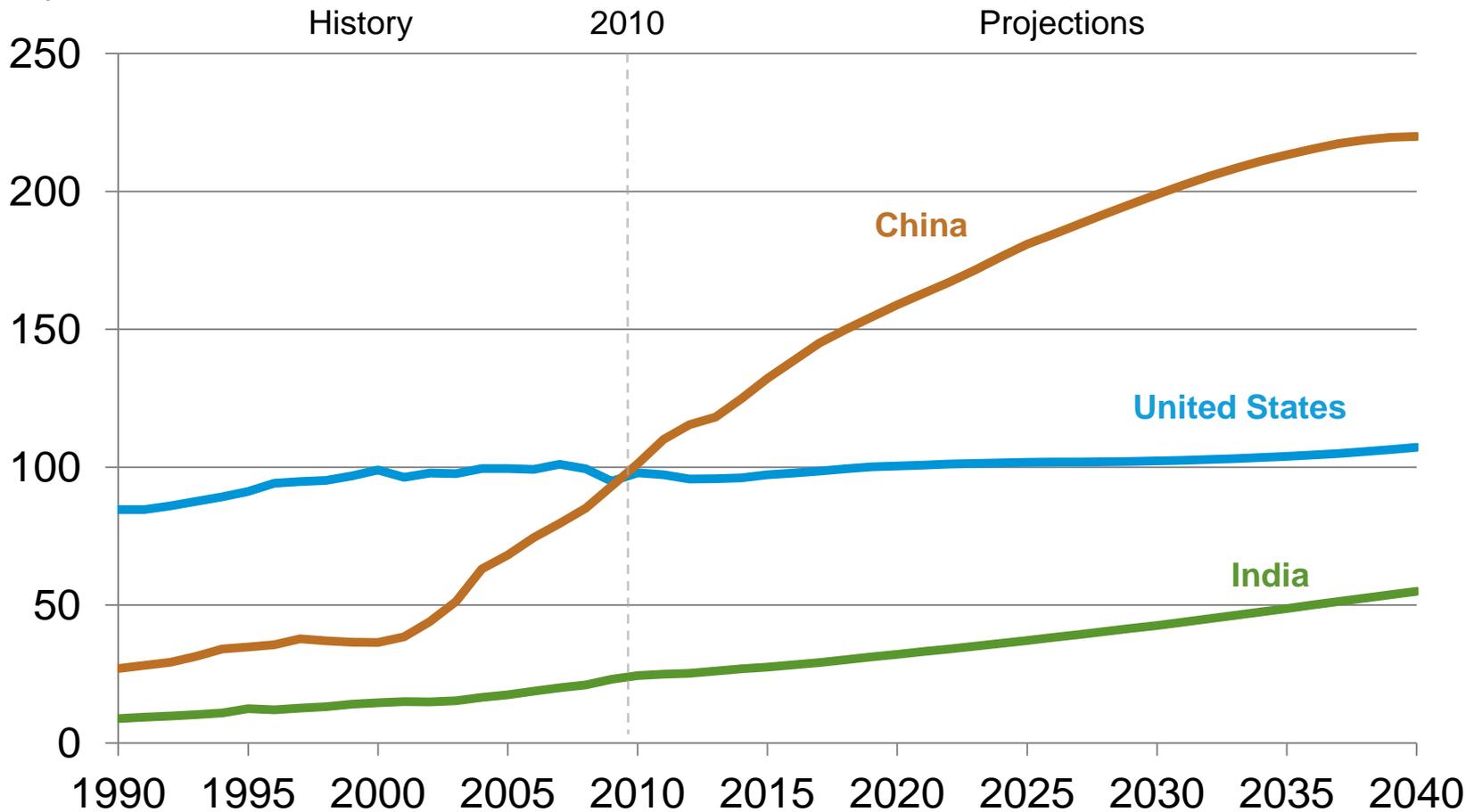
world energy consumption
quadrillion Btu



Source: EIA, International Energy Outlook 2013

By 2040, China's energy use will be double the U.S. level; India's a little more than half despite its faster GDP growth

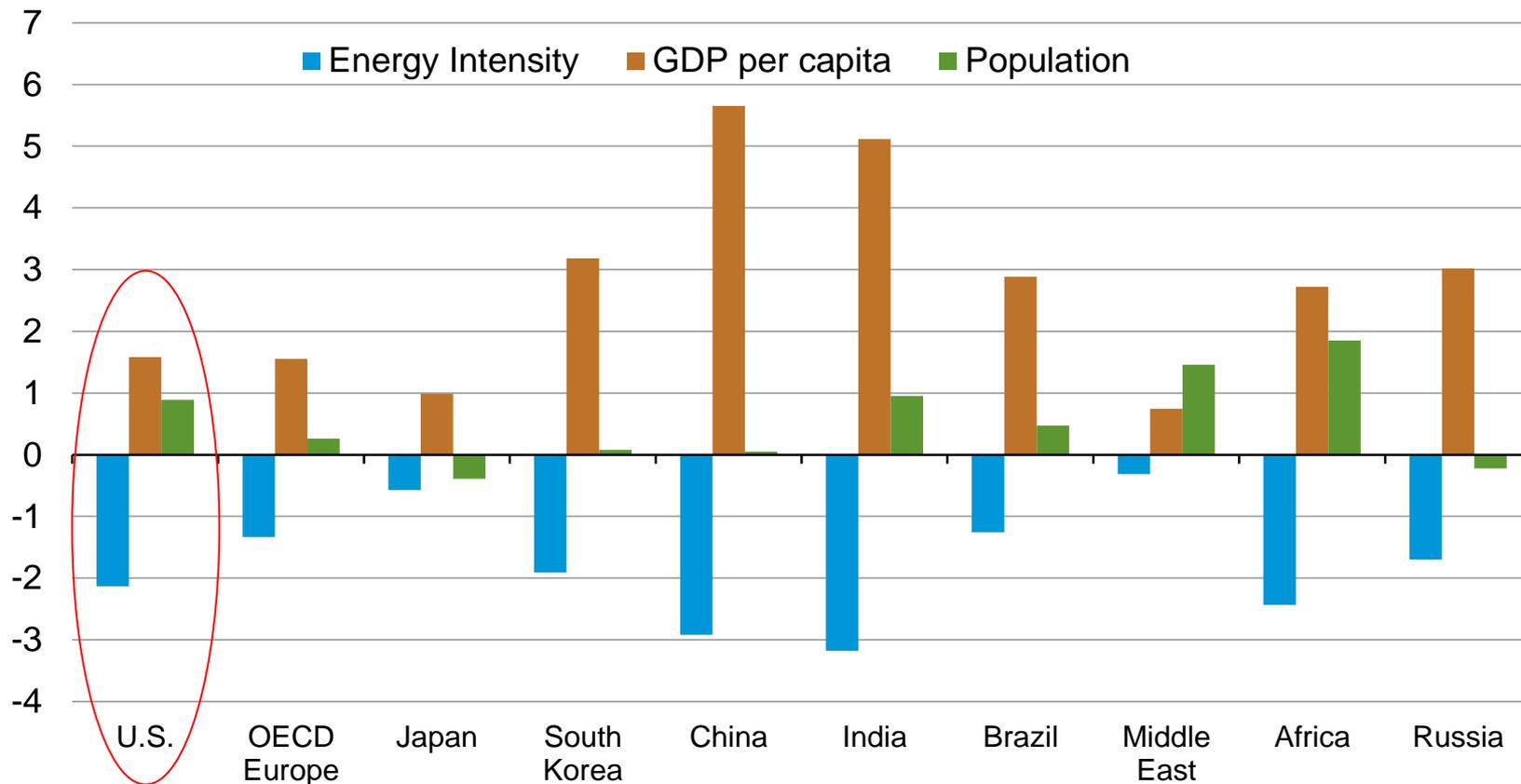
energy consumption by selected country
quadrillion Btu



Source: EIA, International Energy Outlook 2013

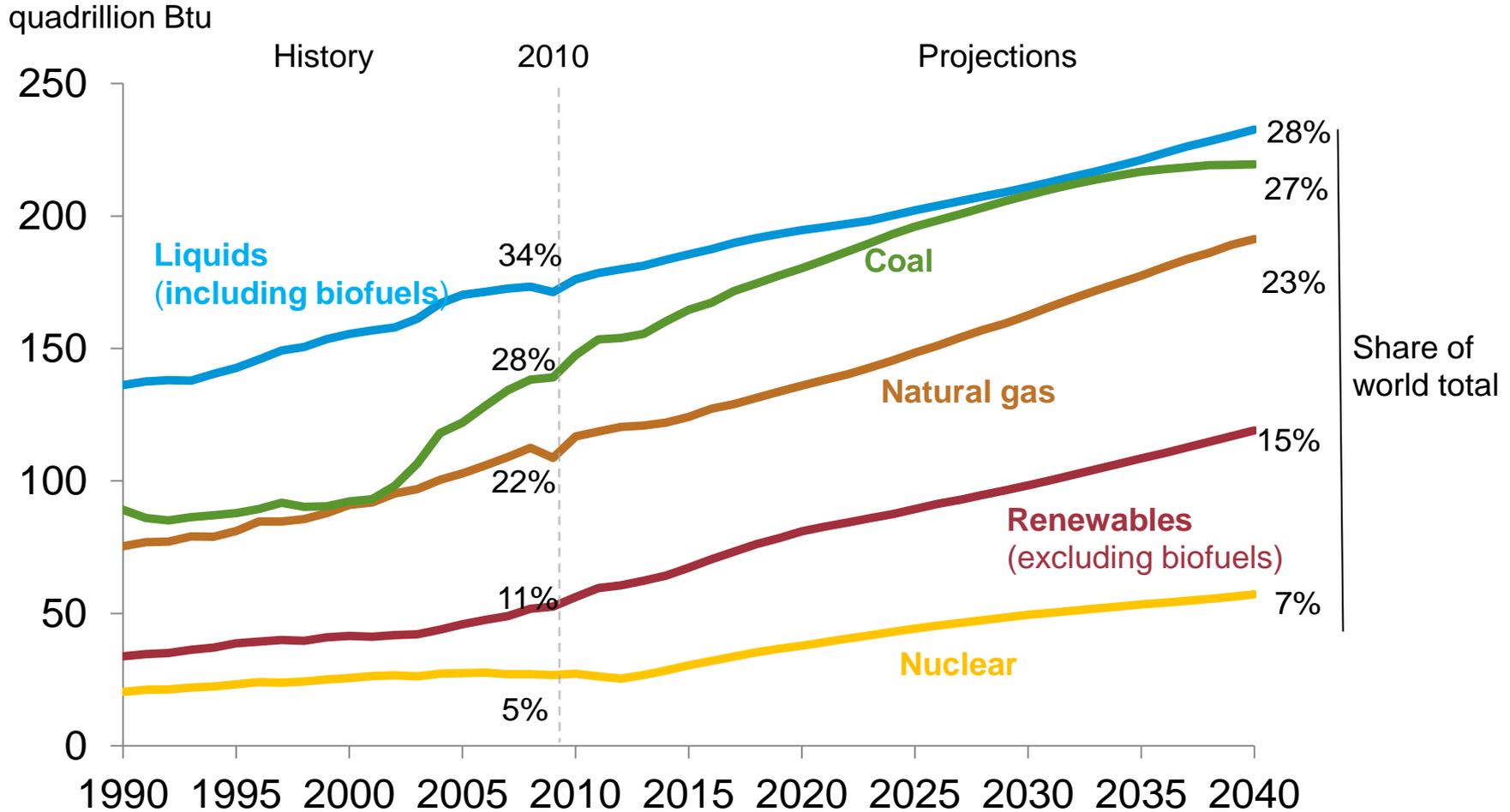
Changes in economic growth and population drive increases in energy use; improvements in energy intensity moderate this trend

average annual change (2010-2040)
percent per year



Source: EIA, International Energy Outlook 2013

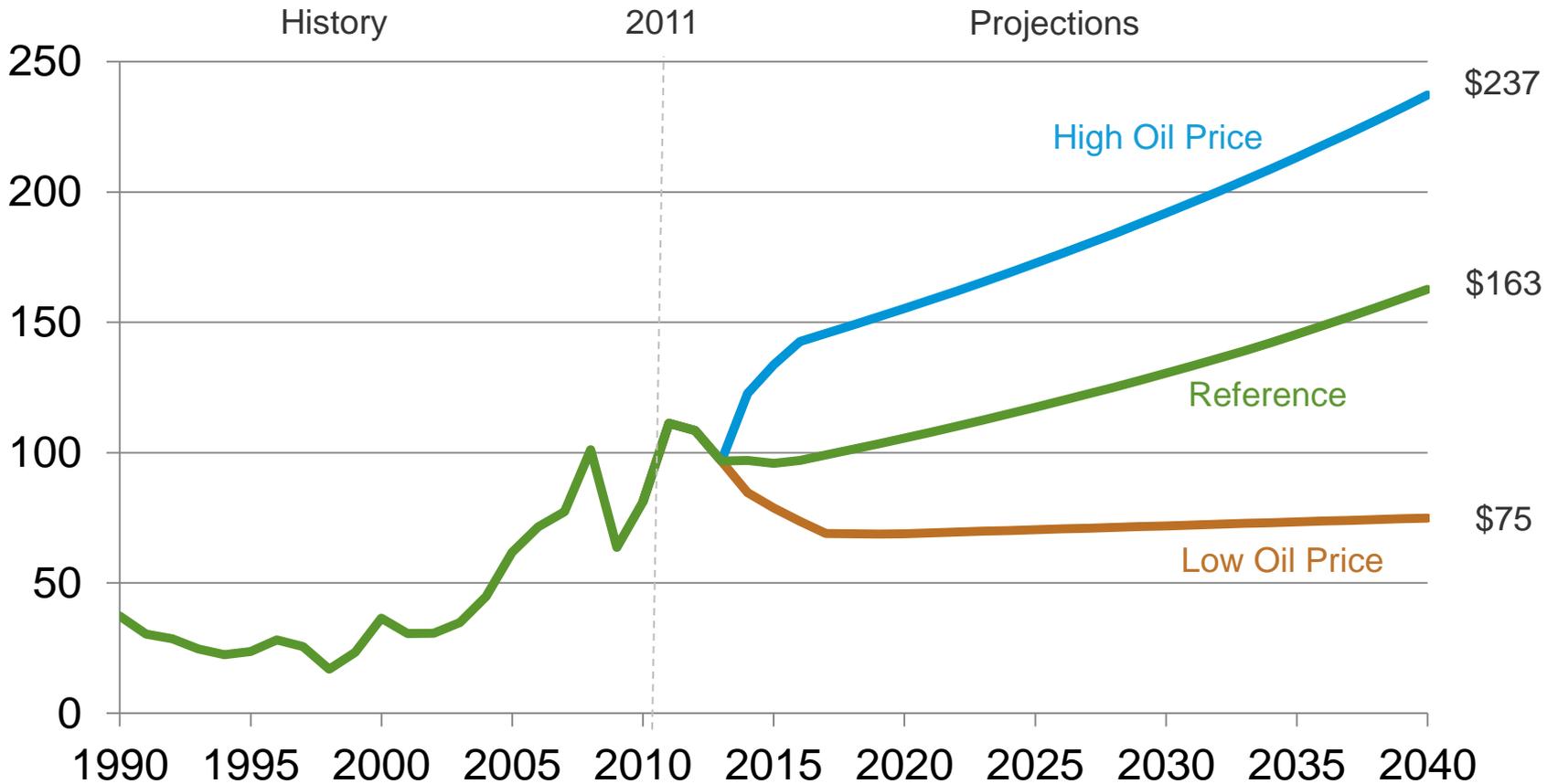
Renewable energy and nuclear power are the fastest growing source of world energy consumption



Source: EIA, International Energy Outlook 2013

There is uncertainty about future oil prices

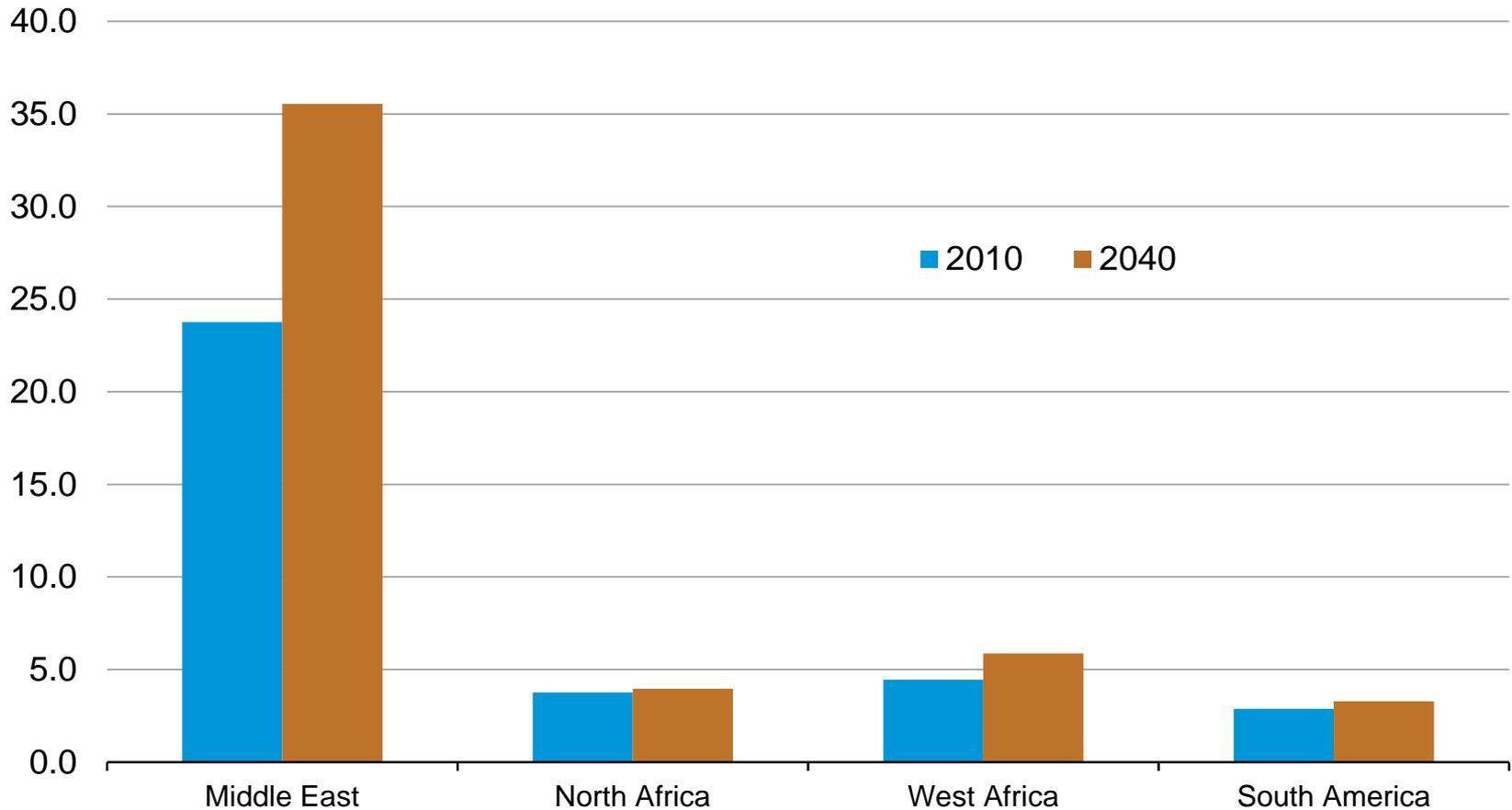
Brent crude oil price paths
real 2011 dollars per barrel



Source: EIA, International Energy Outlook 2013

Growth in OPEC production comes mainly from the Middle East

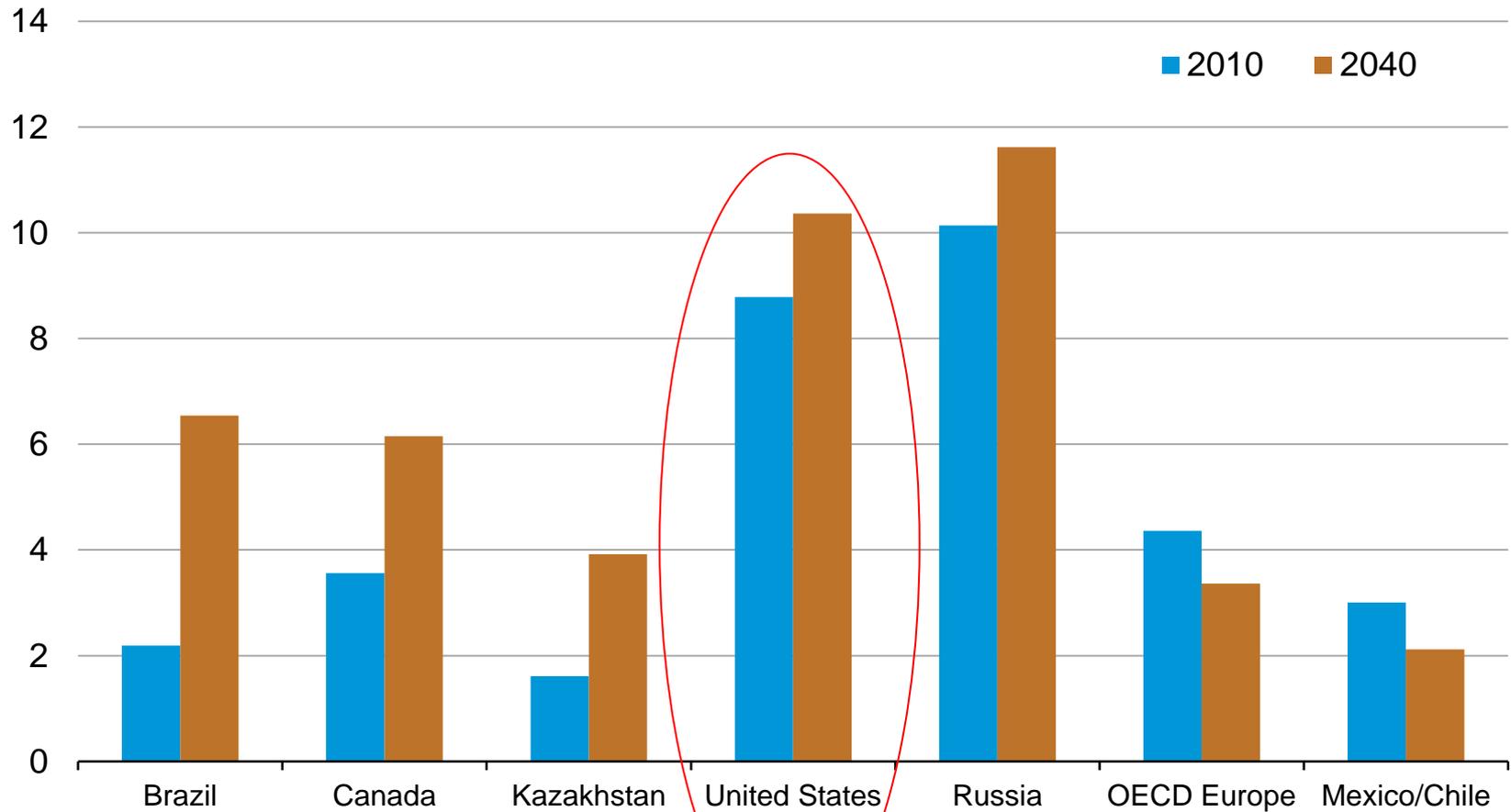
OPEC petroleum production
million barrels per day



Source: EIA, *International Energy Outlook 2013*

Non-OPEC petroleum supply growth is concentrated in the United States and four other countries

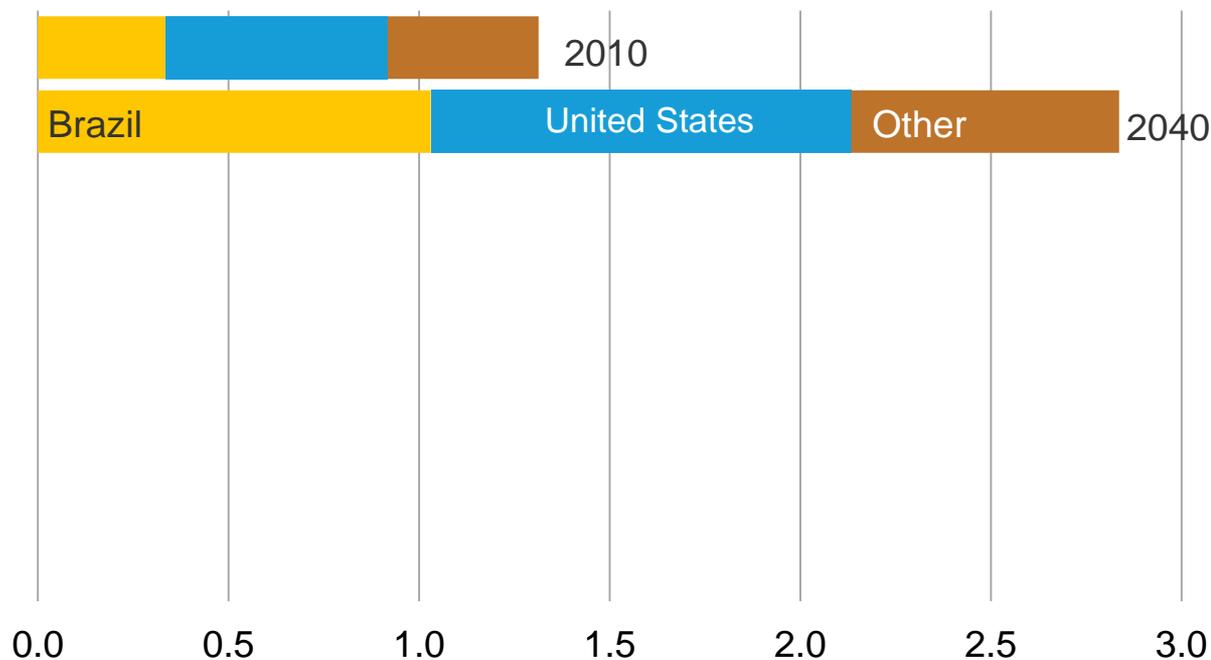
non-OPEC conventional production
million barrels per day



Source: EIA, International Energy Outlook 2013

The United States and Brazil account for most of the projected growth in biofuels production.

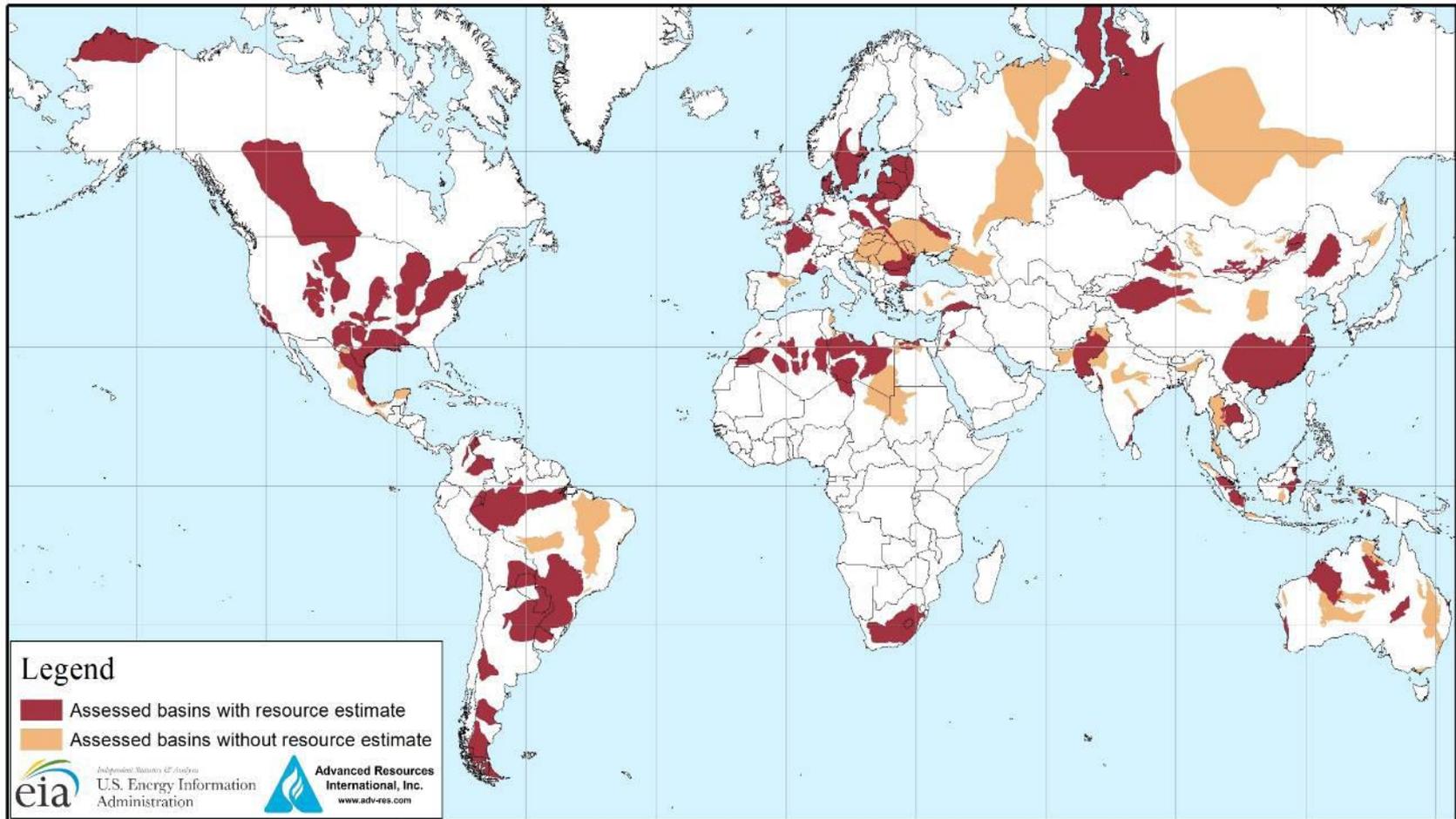
world biofuels production in 2010 and 2040
million barrels per day



Source: EIA, International Energy Outlook 2013

Shale oil and gas have the potential to dramatically alter world energy markets

map of basins with assessed shale oil and gas formations, as of May 2013



Source: United States: EIA and USGS; Other basins: ARI

Potential resources: Top 10 countries with technically recoverable shale resources

Shale oil		
Rank	Country	Billion barrels
1	Russia	75
2	United States	58
3	China	32
4	Argentina	27
5	Libya	26
6	Venezuela	13
7	Mexico	13
8	Pakistan	9
9	Canada	9
10	Indonesia	8
	World total	345

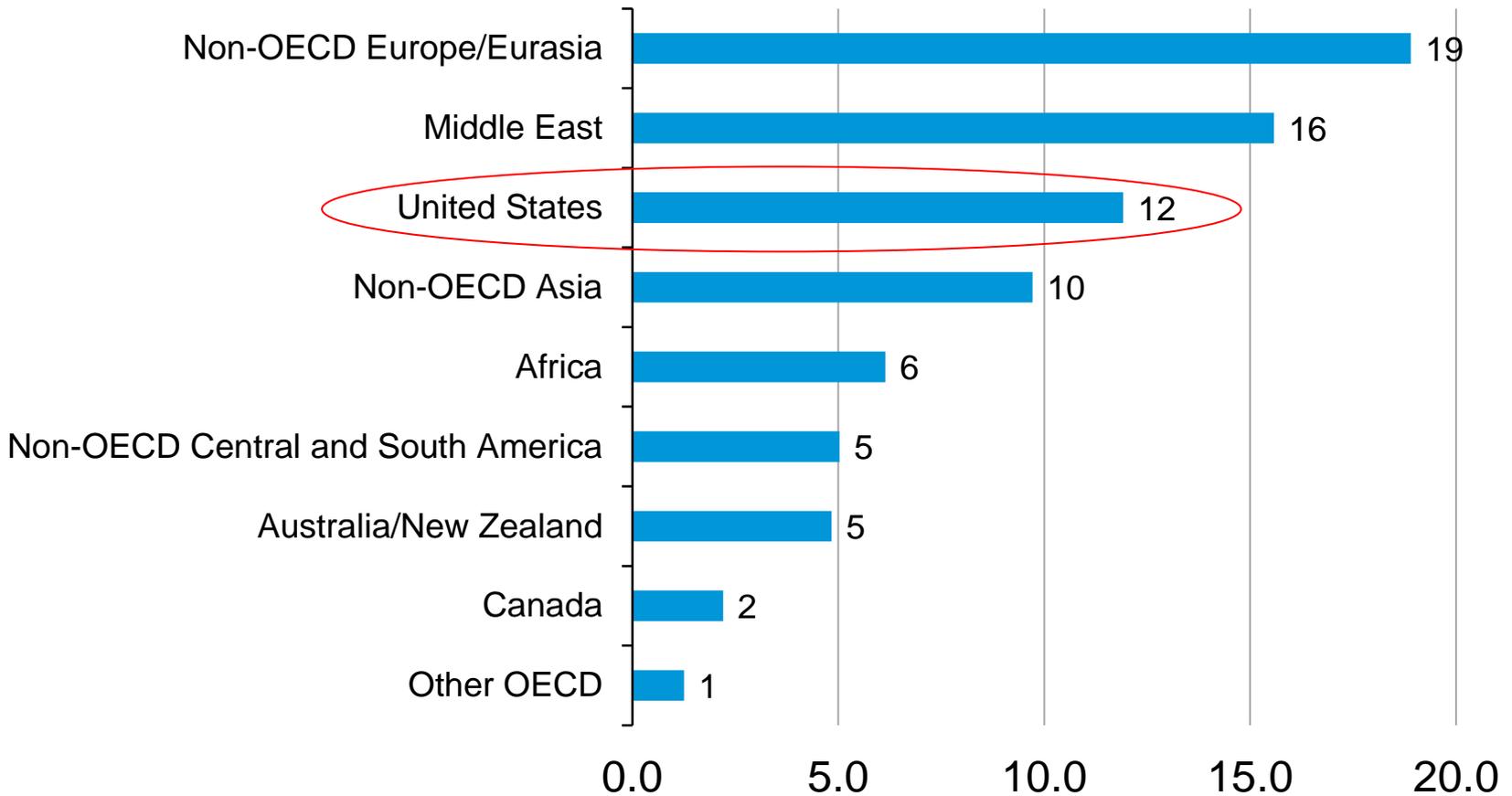
Shale gas		
Rank	Country	Trillion cubic feet
1	China	1,115
2	Argentina	802
3	Algeria	707
4	United States	665
5	Canada	573
6	Mexico	545
7	Australia	437
8	South Africa	390
9	Russia	285
10	Brazil	245
	World total	7,299

Source: United States: EIA and USGS; Other basins: ARI.

Note: ARI estimates U.S. shale oil resources at 48 billion barrels and U.S. shale gas resources at 1,161 trillion cubic feet.

Non-OECD Europe/Eurasia, Middle East, and the United States account for the largest increases in natural gas production

growth in natural gas production 2010-2040
trillion cubic feet

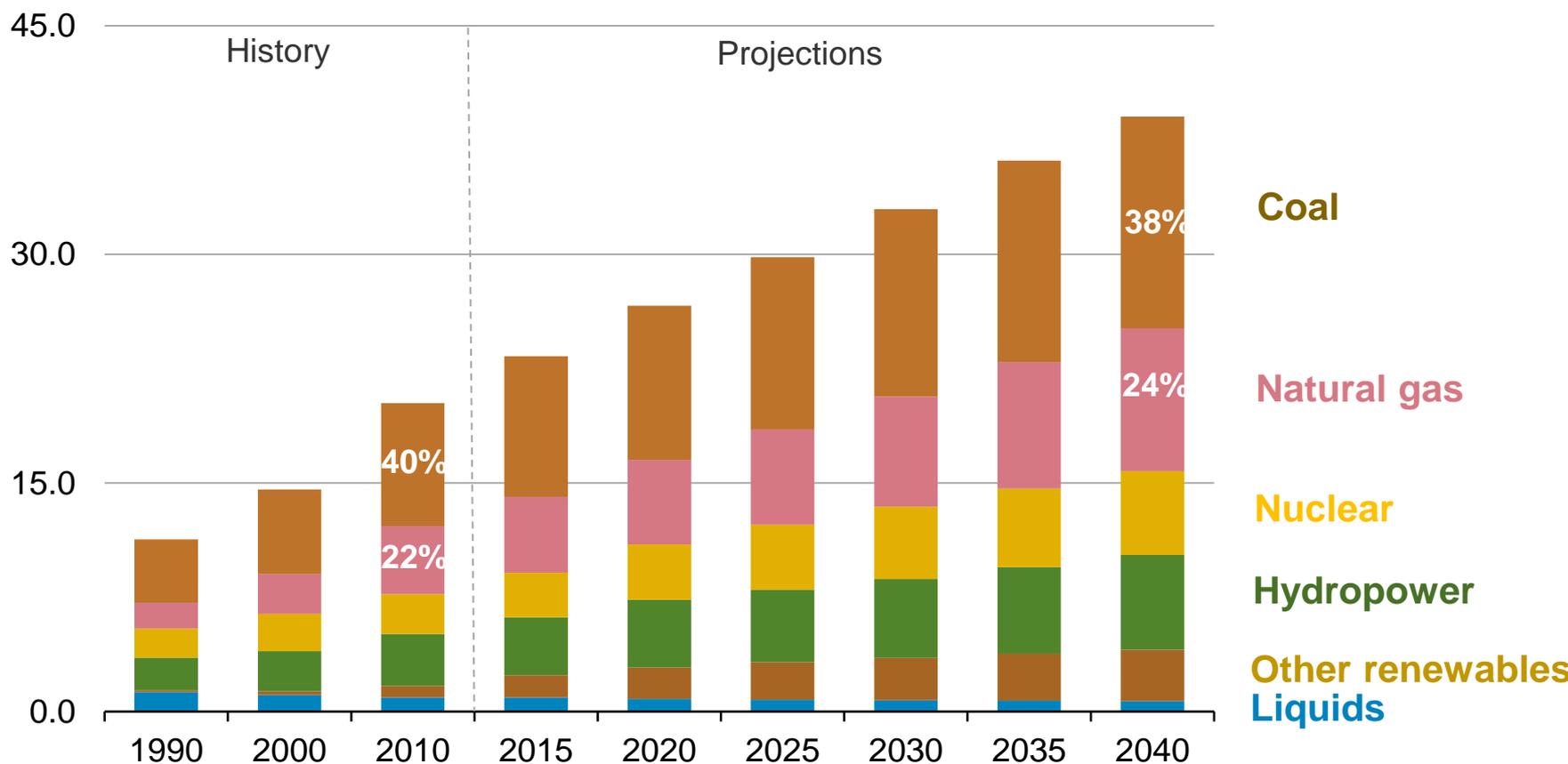


Source: EIA, *International Energy Outlook 2013*

For world electricity generation, renewables and natural gas are the fastest growing sources, but coal still fuels the largest share in 2040

world electricity generation by fuel

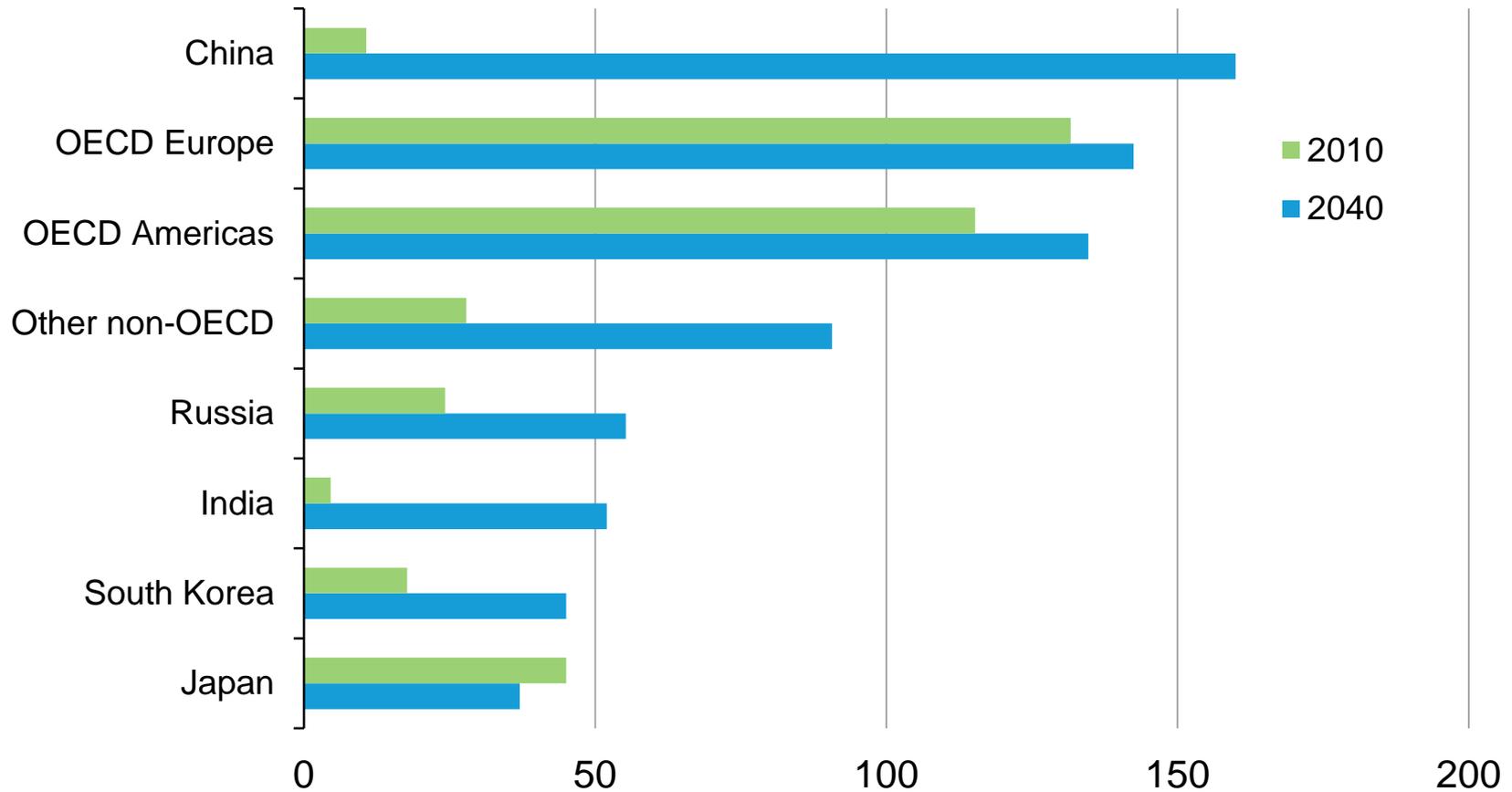
billion kilowatthours



Source: EIA, International Energy Outlook 2013

China accounts for more than 40 percent of the global net increase in nuclear capacity

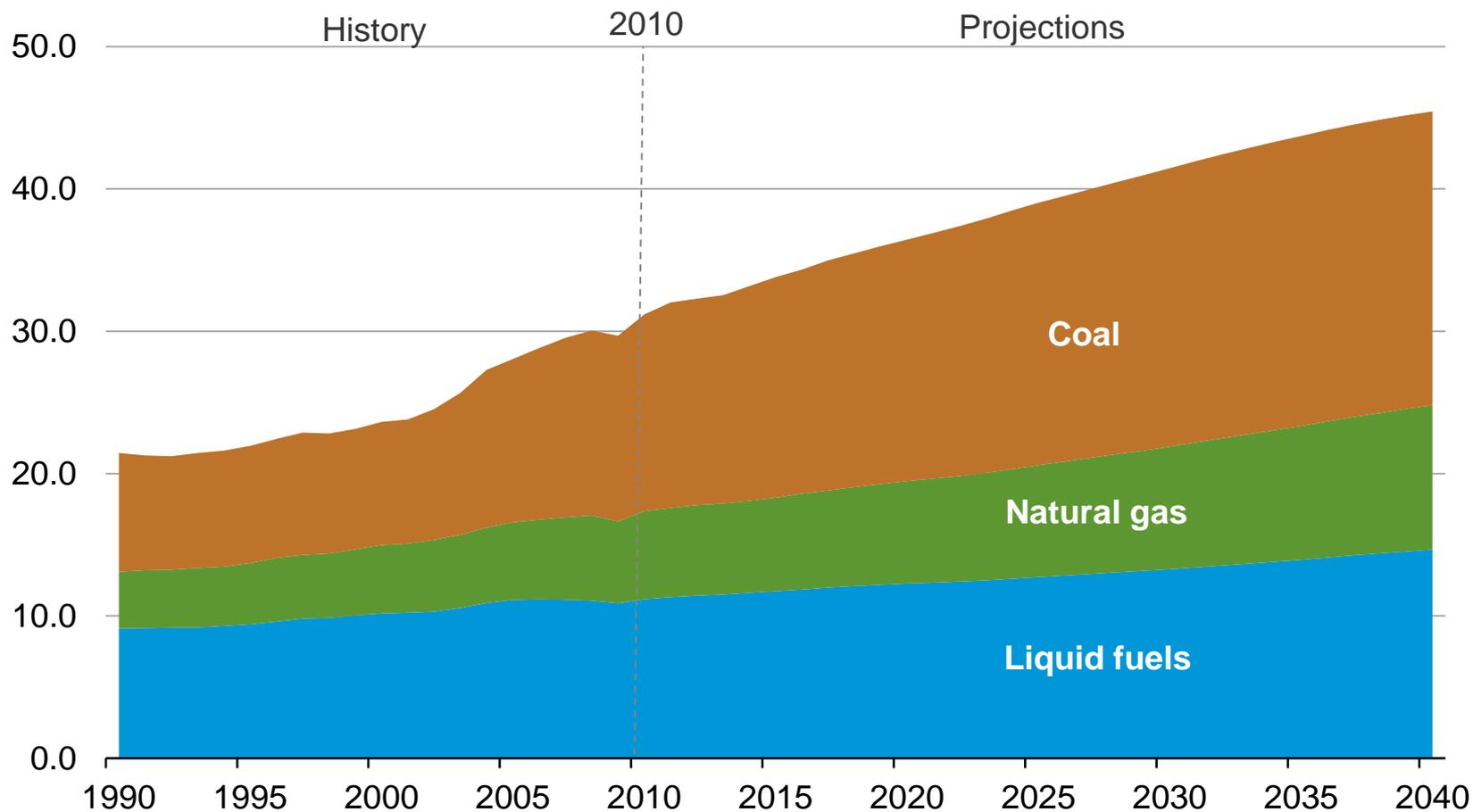
world nuclear electricity generating capacity, 2010 and 2040
gigawatts



Source: EIA, International Energy Outlook 2013

Coal continues to account for the largest share of energy-related carbon dioxide emissions throughout the projection

world energy-related carbon dioxide emissions by fuel
billion metric tons



Source: EIA, International Energy Outlook 2013

There are many issues that increase uncertainty...

- Unresolved long-term effects of economic issues in the United States and Europe; and the economic slowdown in 2012-13 in key emerging economies, including China, India, and Brazil.
- The timing of Japan's full recovery from the impacts of the 2011 nuclear disaster at Fukushima
- Social unrest in the Middle East and North Africa
- Shale gas, tight gas, and coalbed methane production potential
- OPEC market share decisions