Outlook for U.S. shale oil and gas

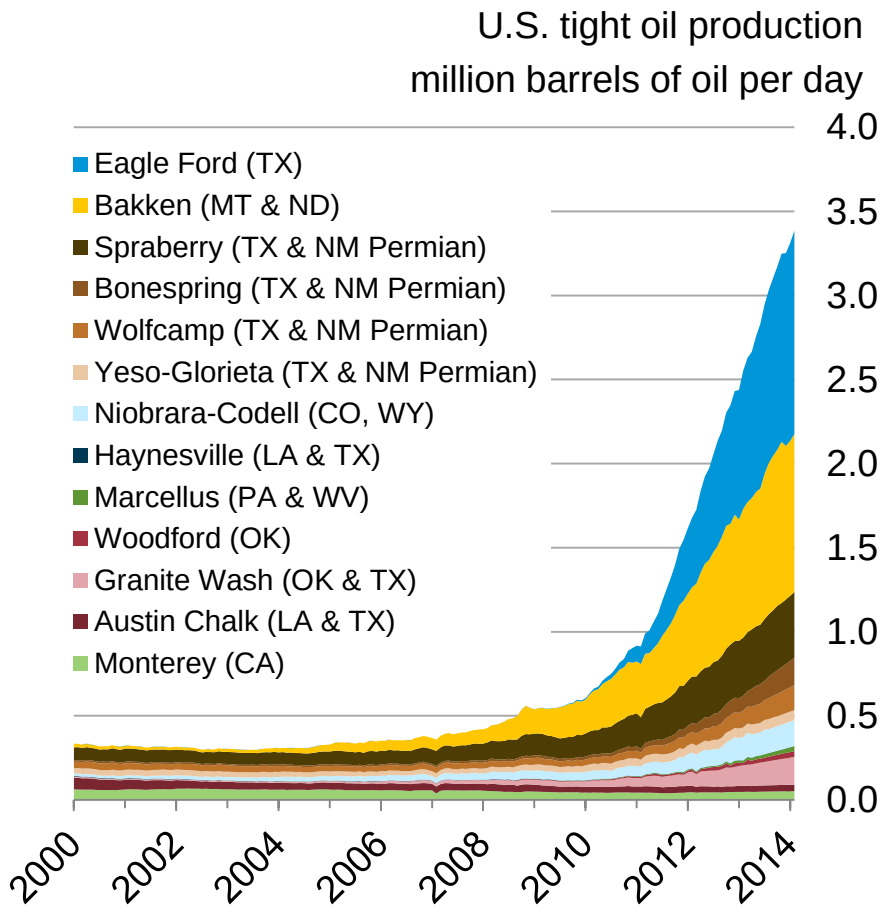
International Monetary Fund

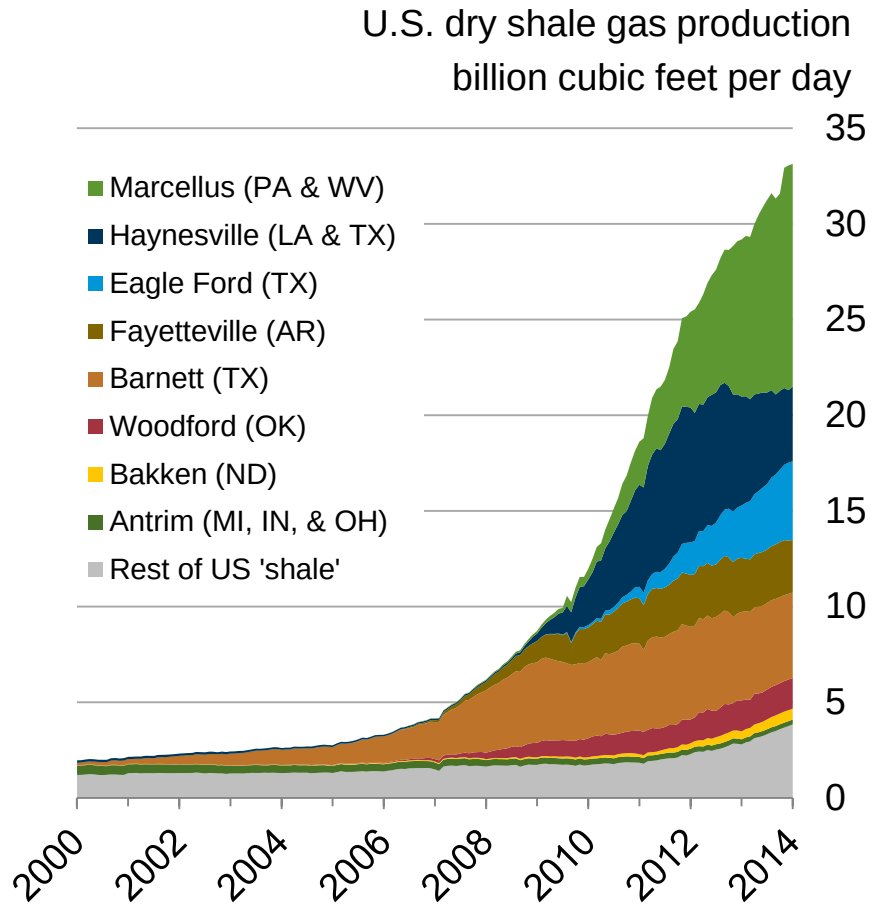
March 27, 2014 | Washington, DC

By

Adam Sieminski, EIA Administrator

The U.S. has experienced a rapid increase in natural gas and oil production from shale and other tight resources



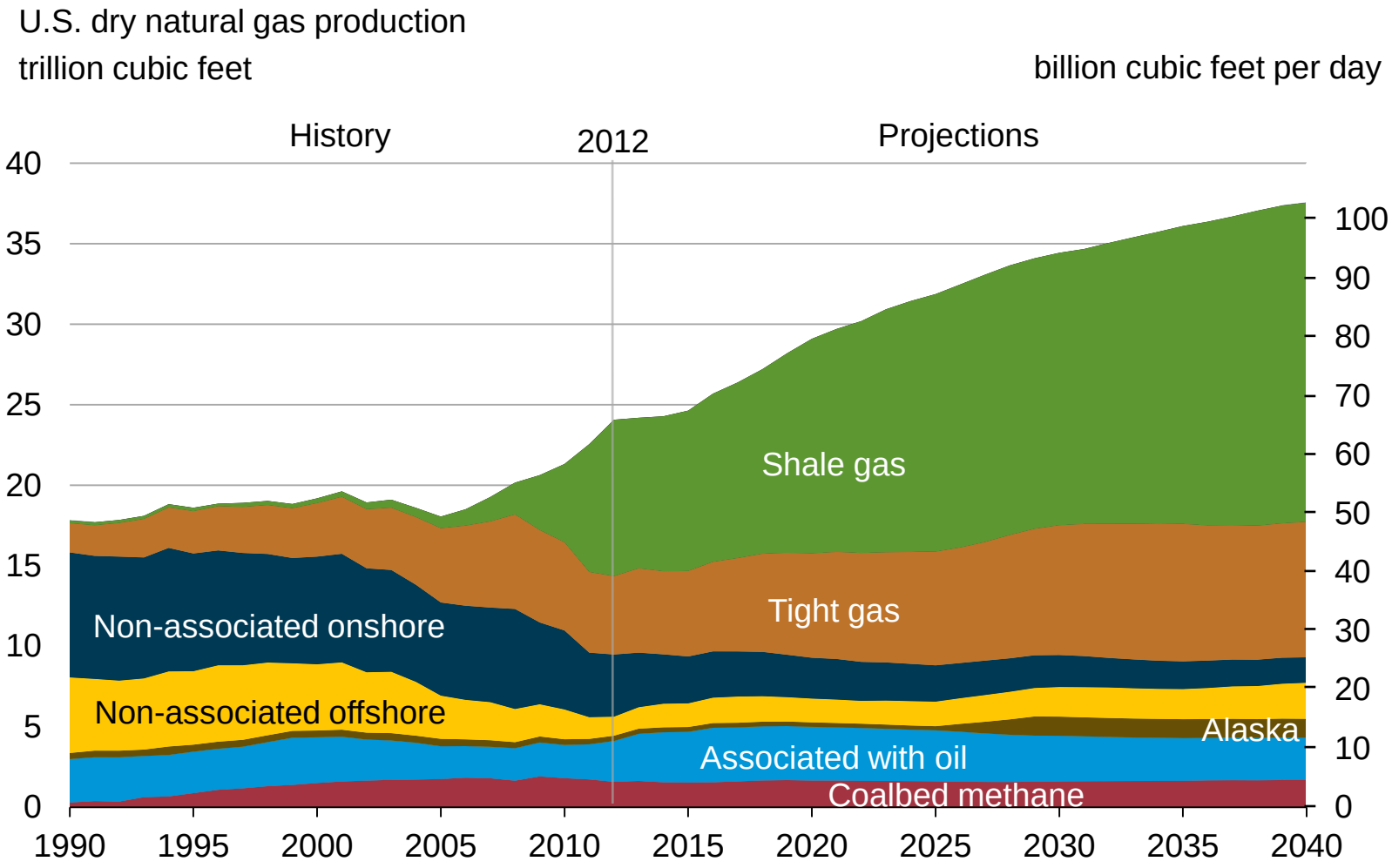


Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through February 2014 and represent EIA's official tight oil & shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).

U.S. crude oil and natural gas production is up dramatically since 2010 and will continue to grow rapidly; this has strategic implications for the United States

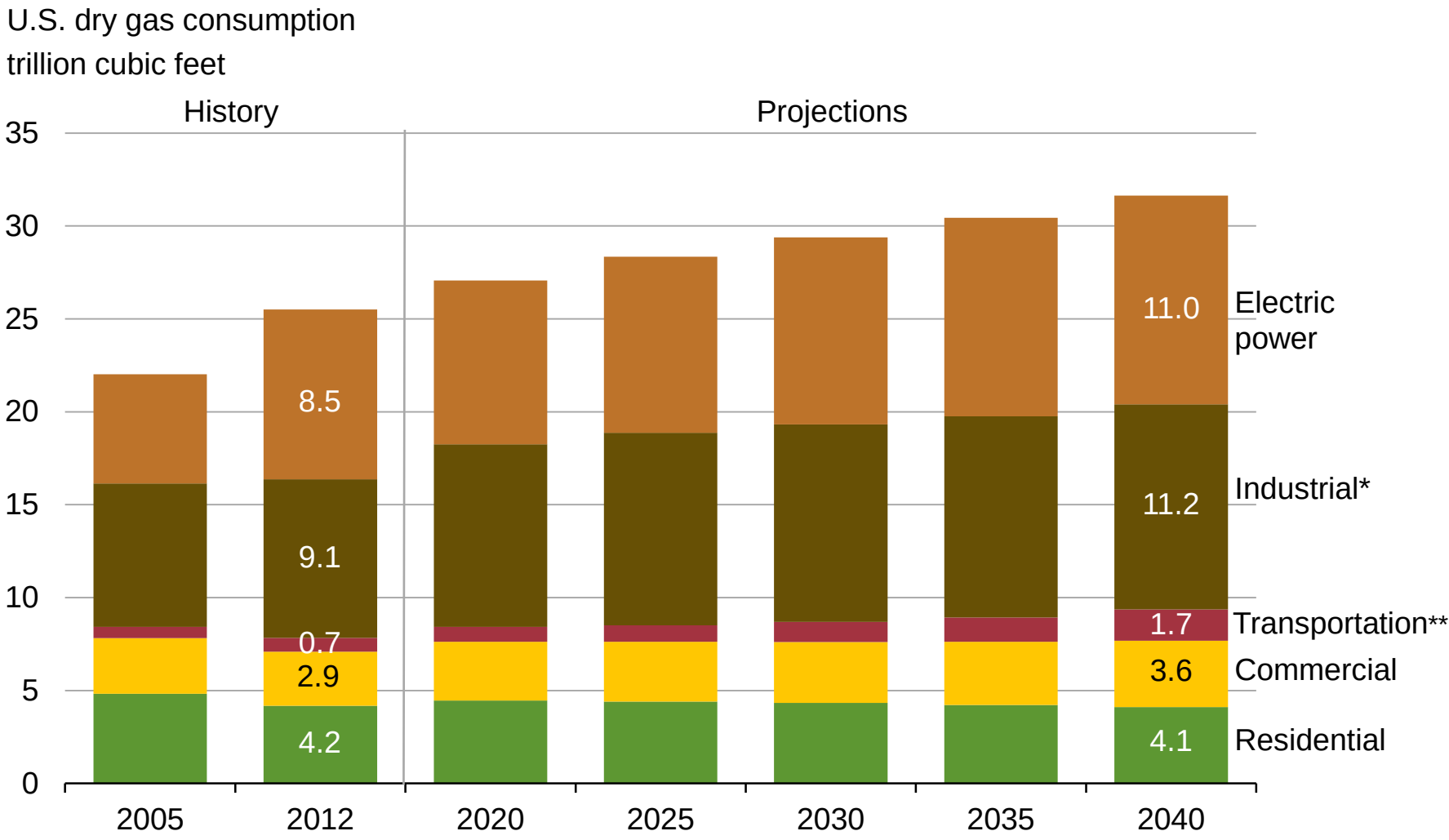
- Refinery operations/investment
- Logistics infrastructure investment
- Exports of petroleum products
- Exports of crude oil and natural gas (LNG)
- Operation of the Strategic Petroleum Reserve

U.S. shale gas leads growth in total gas production through 2040 to reach half of U.S. output



Source: EIA, Annual Energy Outlook 2014 Early Release

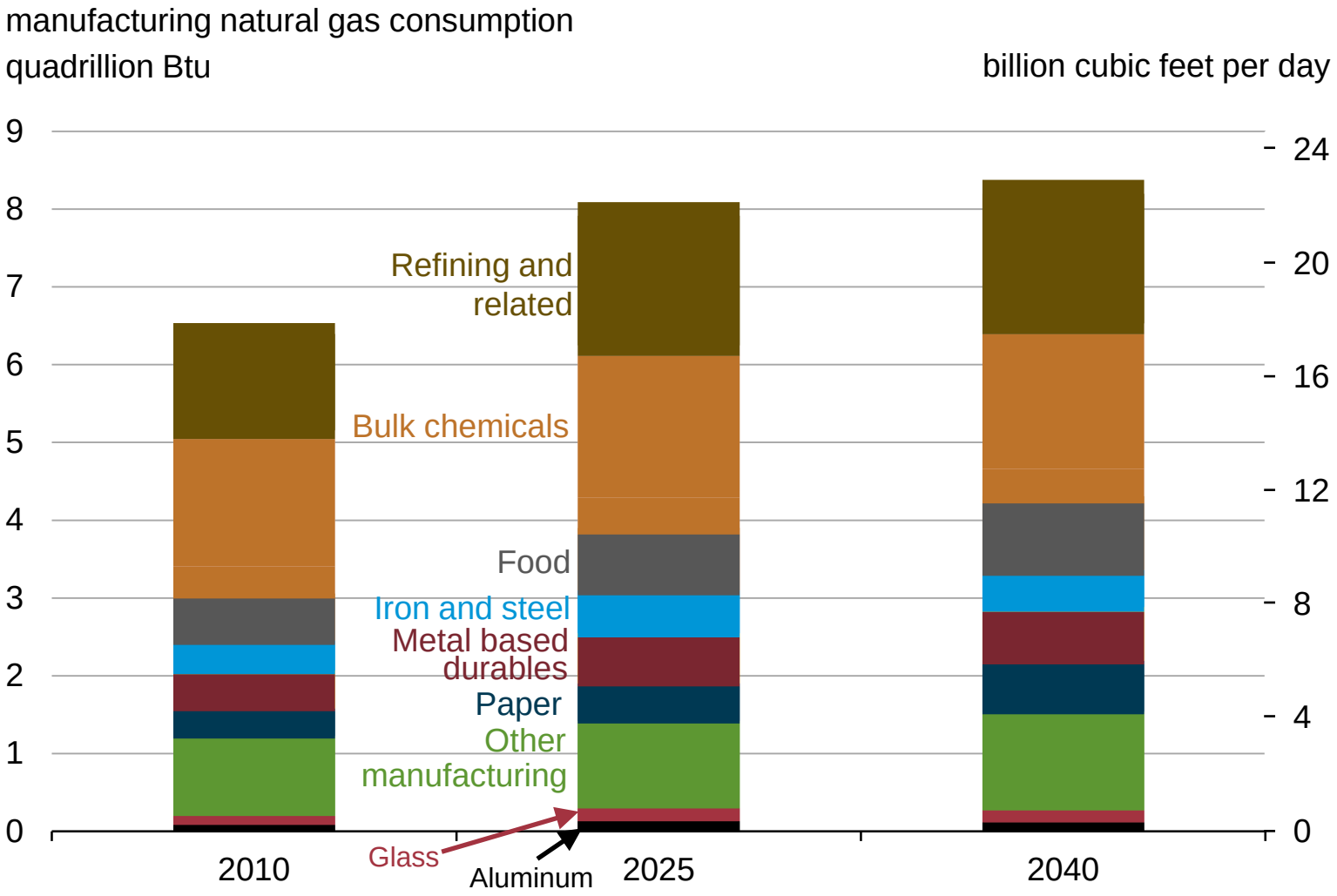
U.S. natural gas consumption growth is driven by electric power, industrial, and transportation use



Source: EIA, Annual Energy Outlook 2014 Early Release

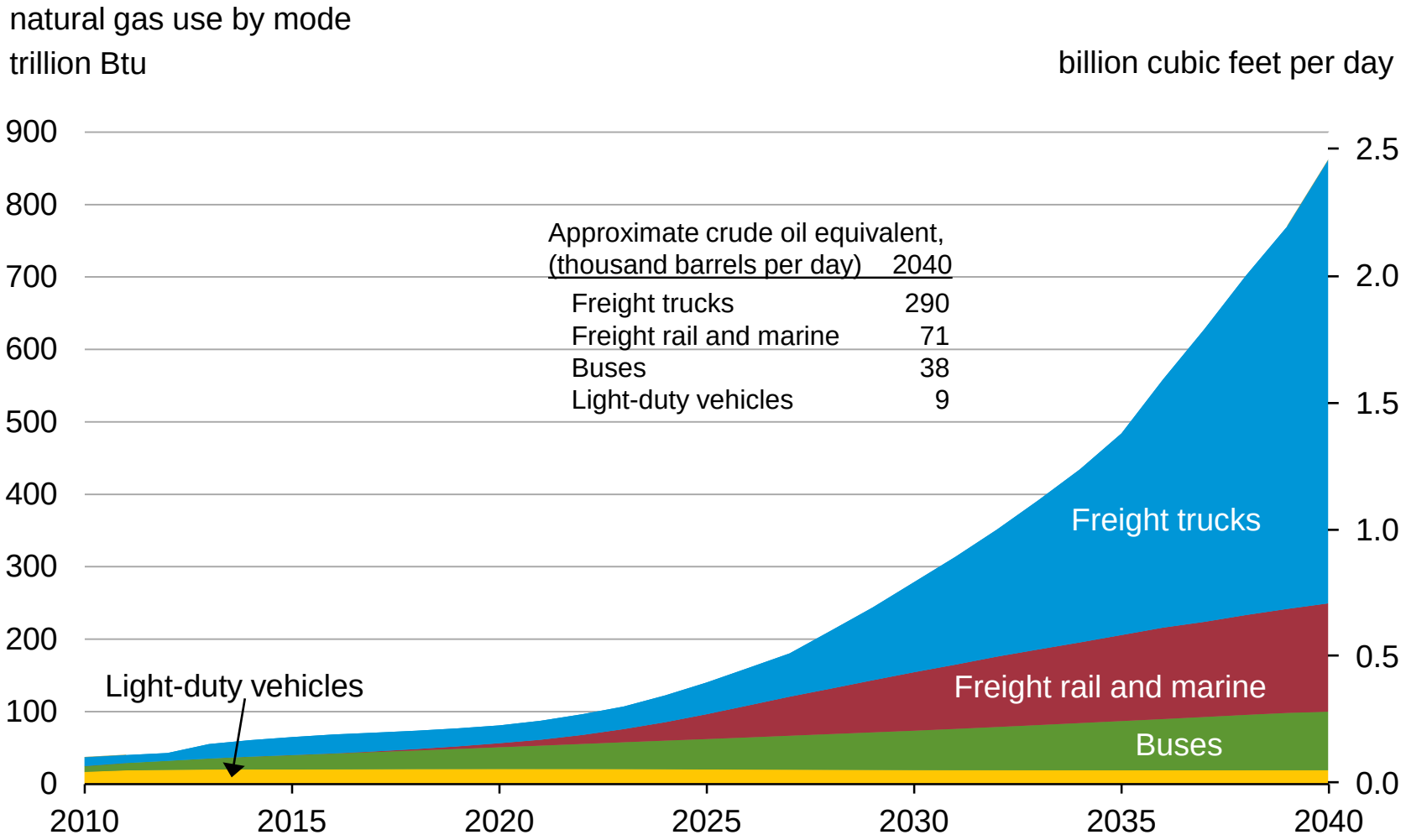
**Includes combined heat-and-power and lease and plant fuel*
***Includes pipeline fuel*

U.S. manufacturing output and natural gas use grows with low natural gas prices, particularly in the near term



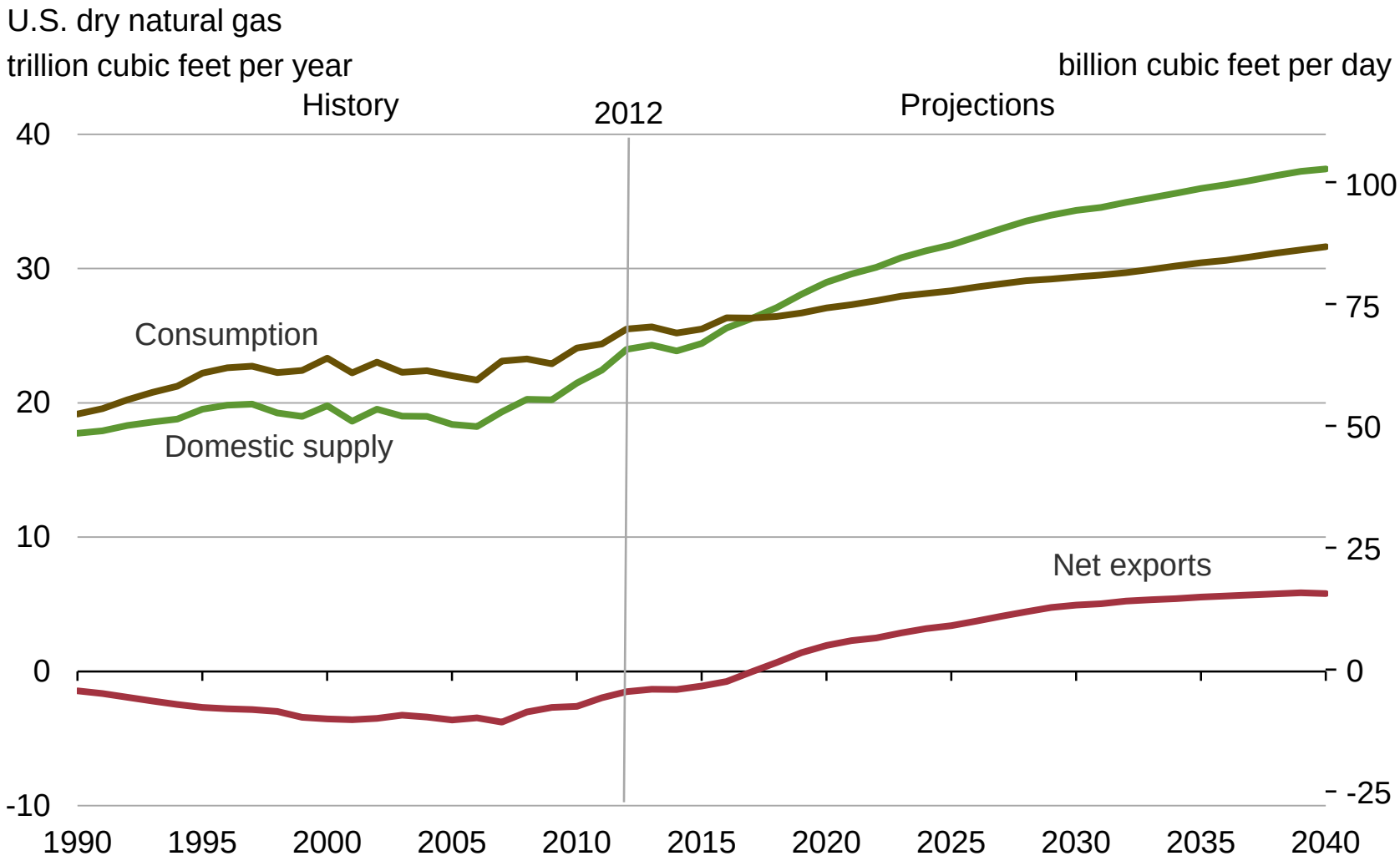
Source: EIA, Annual Energy Outlook 2014 Early Release

U.S. natural gas use in the transportation sector grows rapidly with the largest share in freight trucks



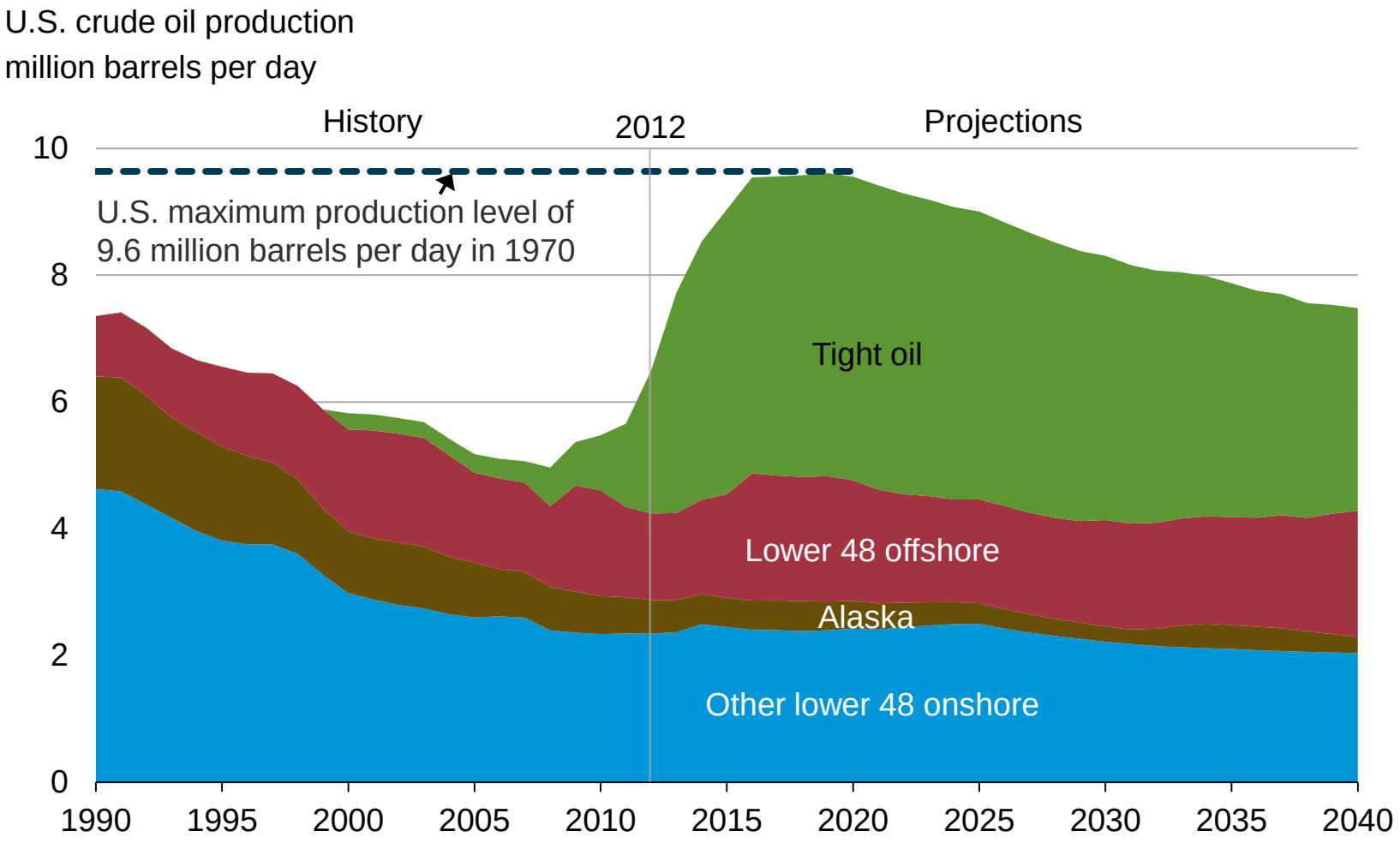
Source: EIA, Annual Energy Outlook 2014 Early Release

U.S. becomes a net exporter of natural gas in the near future



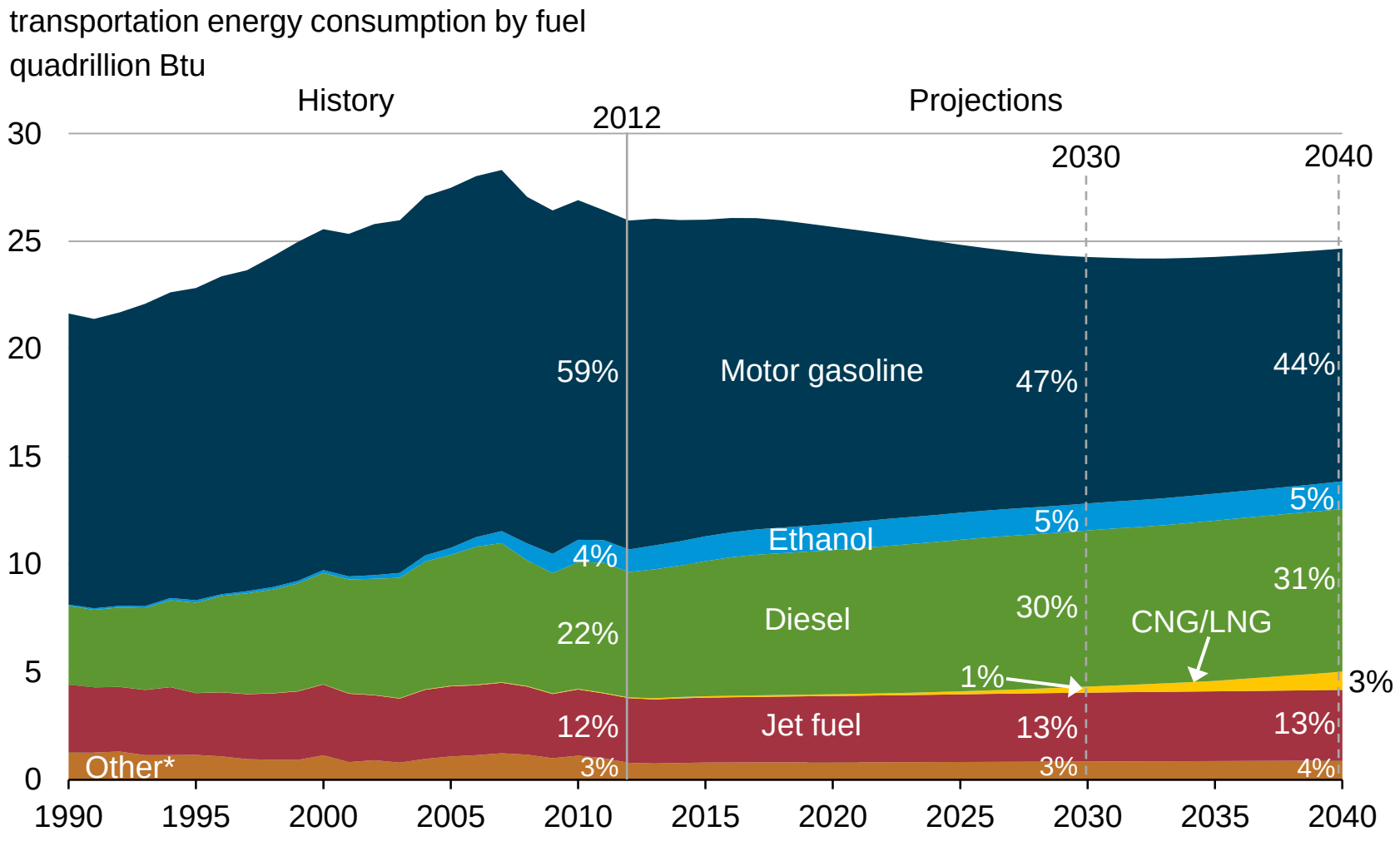
Source: EIA, Annual Energy Outlook 2014 Early Release

Growing tight oil and offshore crude oil production drive U.S. output close to historical high



Source: EIA, Annual Energy Outlook 2014 Early Release

U.S. transportation sector motor gasoline demand declines, while diesel fuel accounts for a growing portion of the market

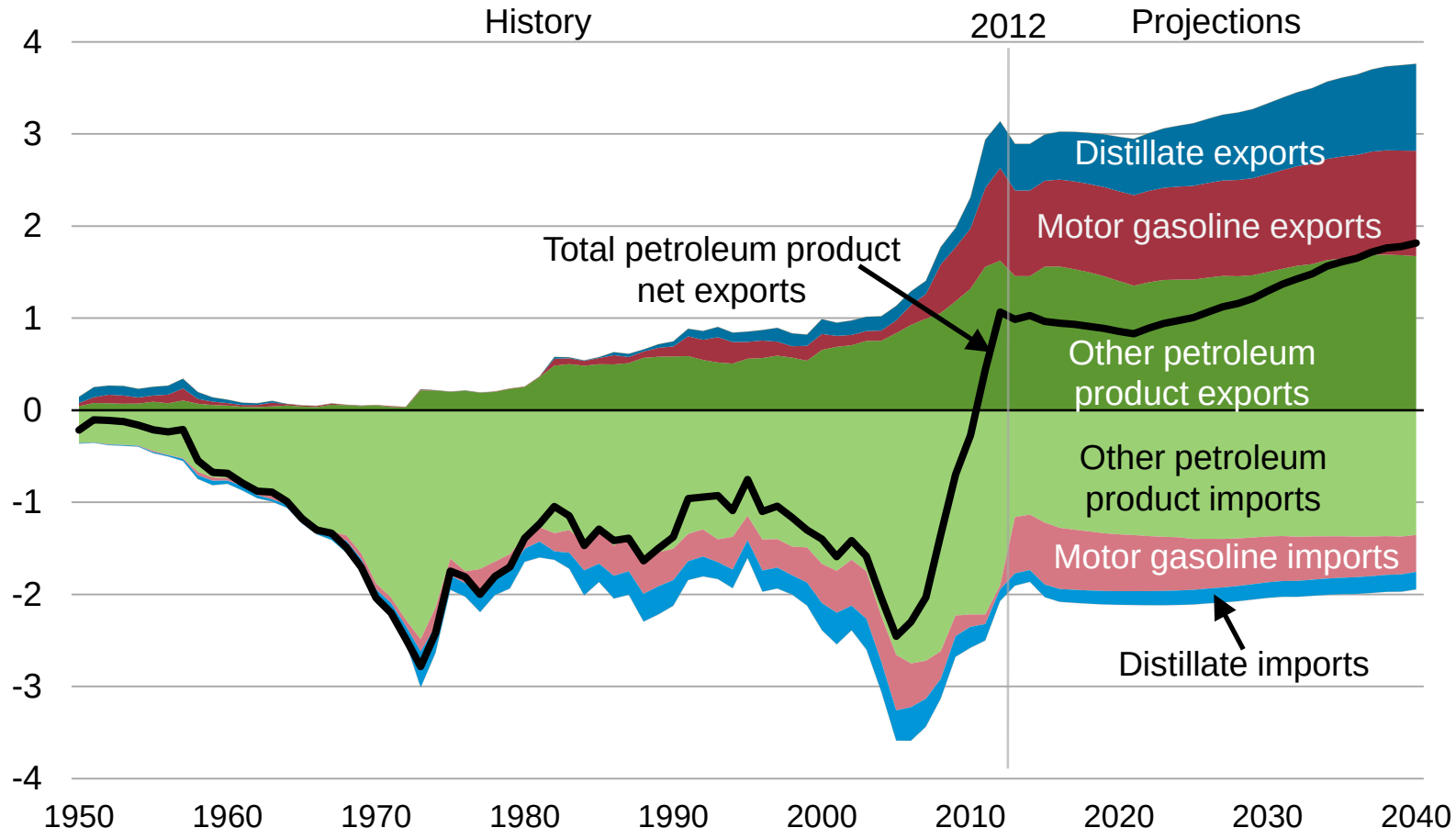


Source: EIA, Annual Energy Outlook 2014 Early Release

**Includes aviation gasoline, propane, residual fuel oil, lubricants, electricity, and liquid hydrogen*

U.S. maintains status as a net exporter of petroleum products

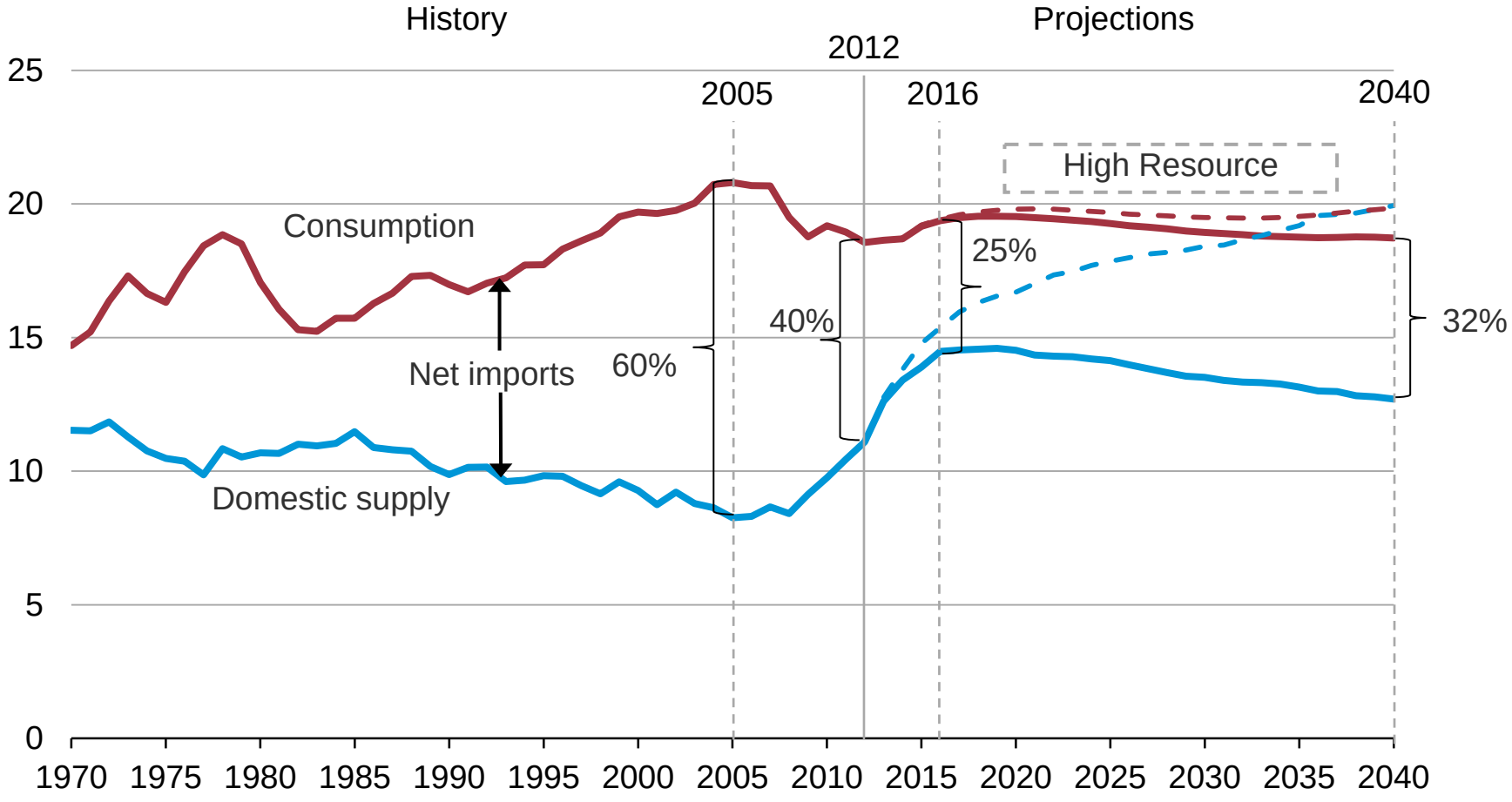
U.S. petroleum product imports and exports
million barrels per day



Source: EIA, Annual Energy Outlook 2014 Early Release

Although oil use is slightly increased in the High Resource case due to lower prices, net import dependence declines rapidly

U.S. liquid fuel supply
million barrels per day

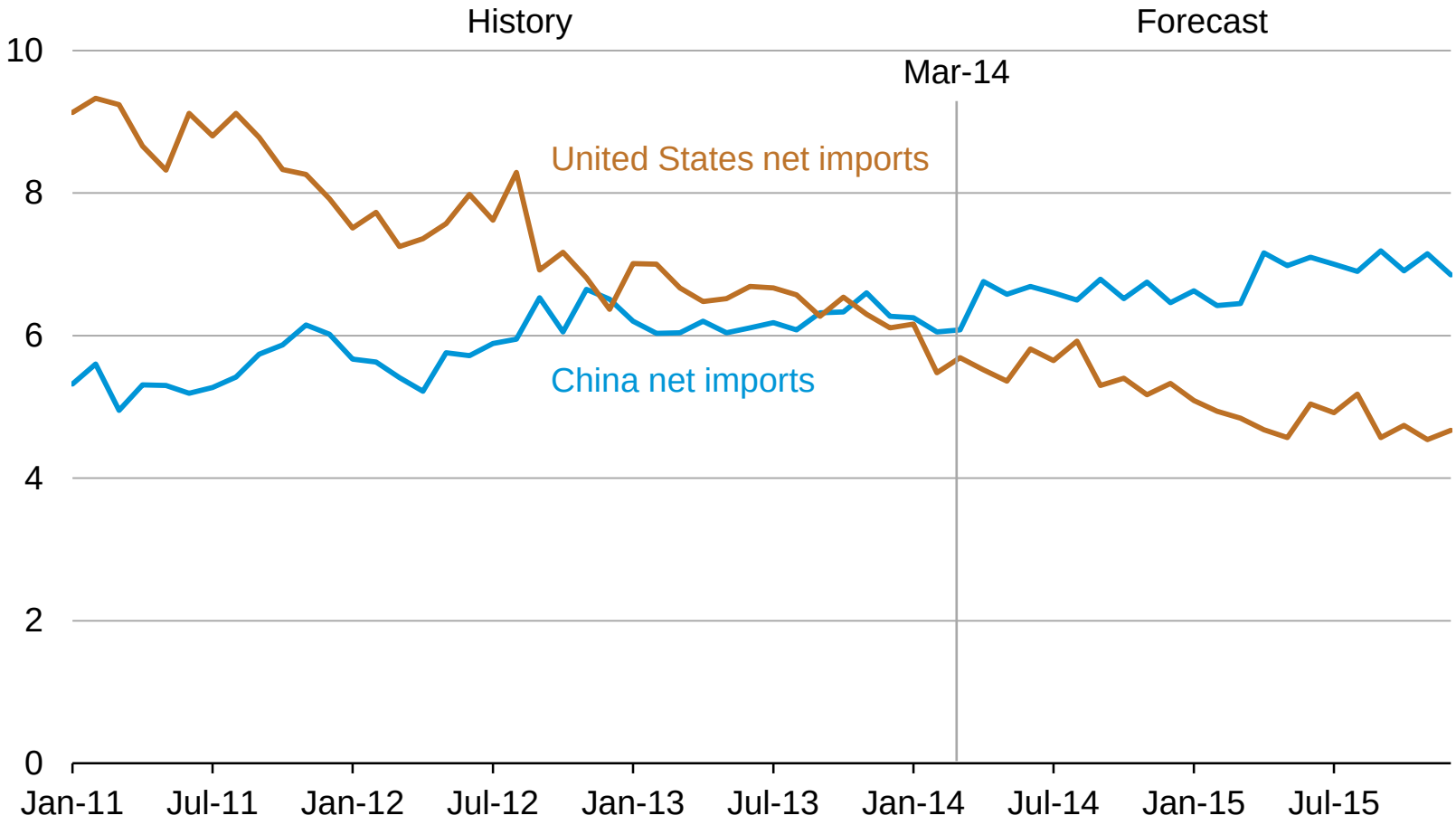


Source: EIA, Annual Energy Outlook 2014 Reference case and High Resource / Improved Technology case

China is now the world's largest net oil importer

net imports for China and the United States

millions of barrels per day

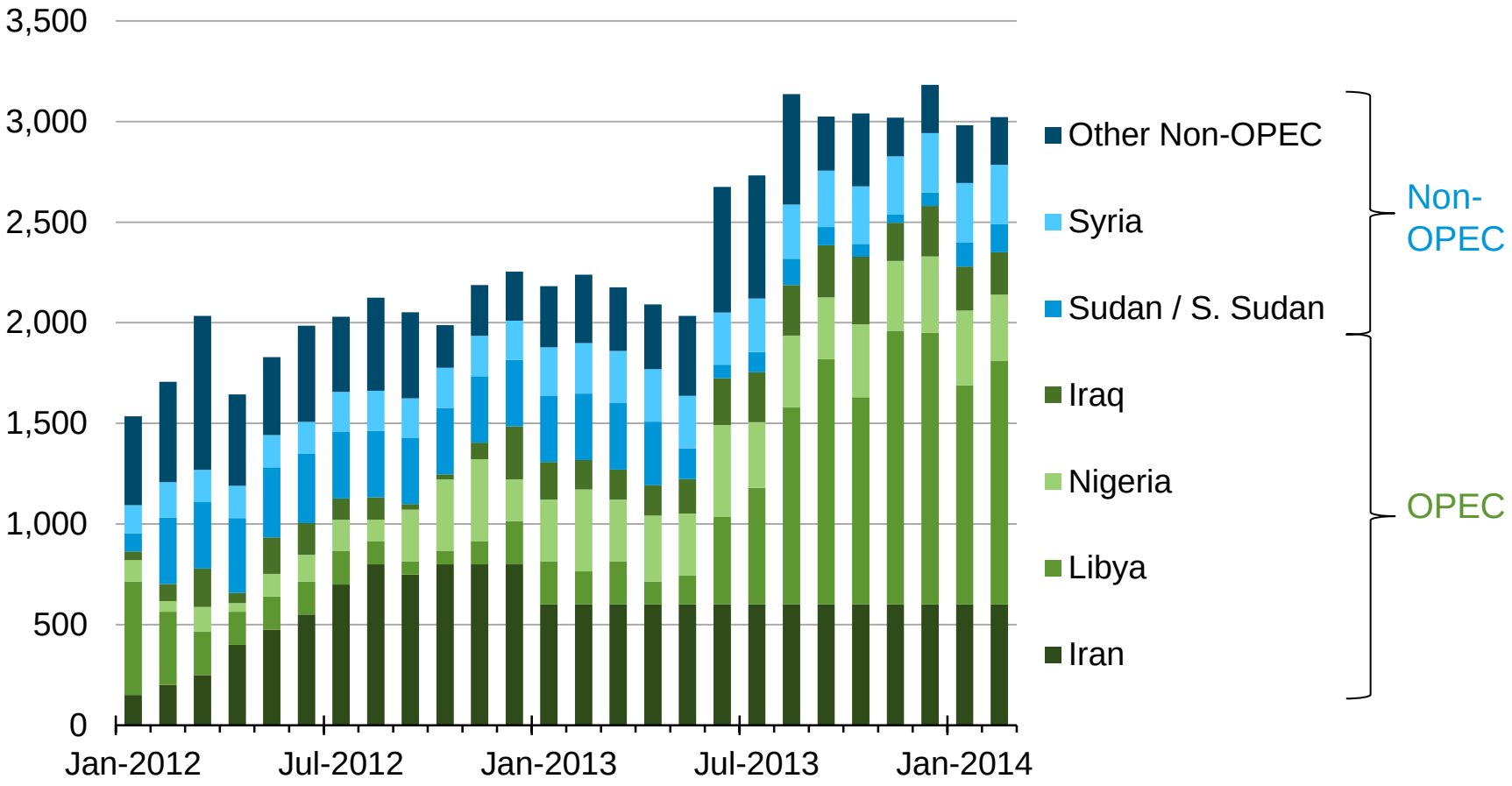


Note: Net oil imports are defined as total liquid fuels consumption less domestic production

Source: EIA, Short-Term Energy Outlook, March 2014

OPEC countries now account for most unplanned outages

estimated unplanned crude oil production outages
thousand barrels per day



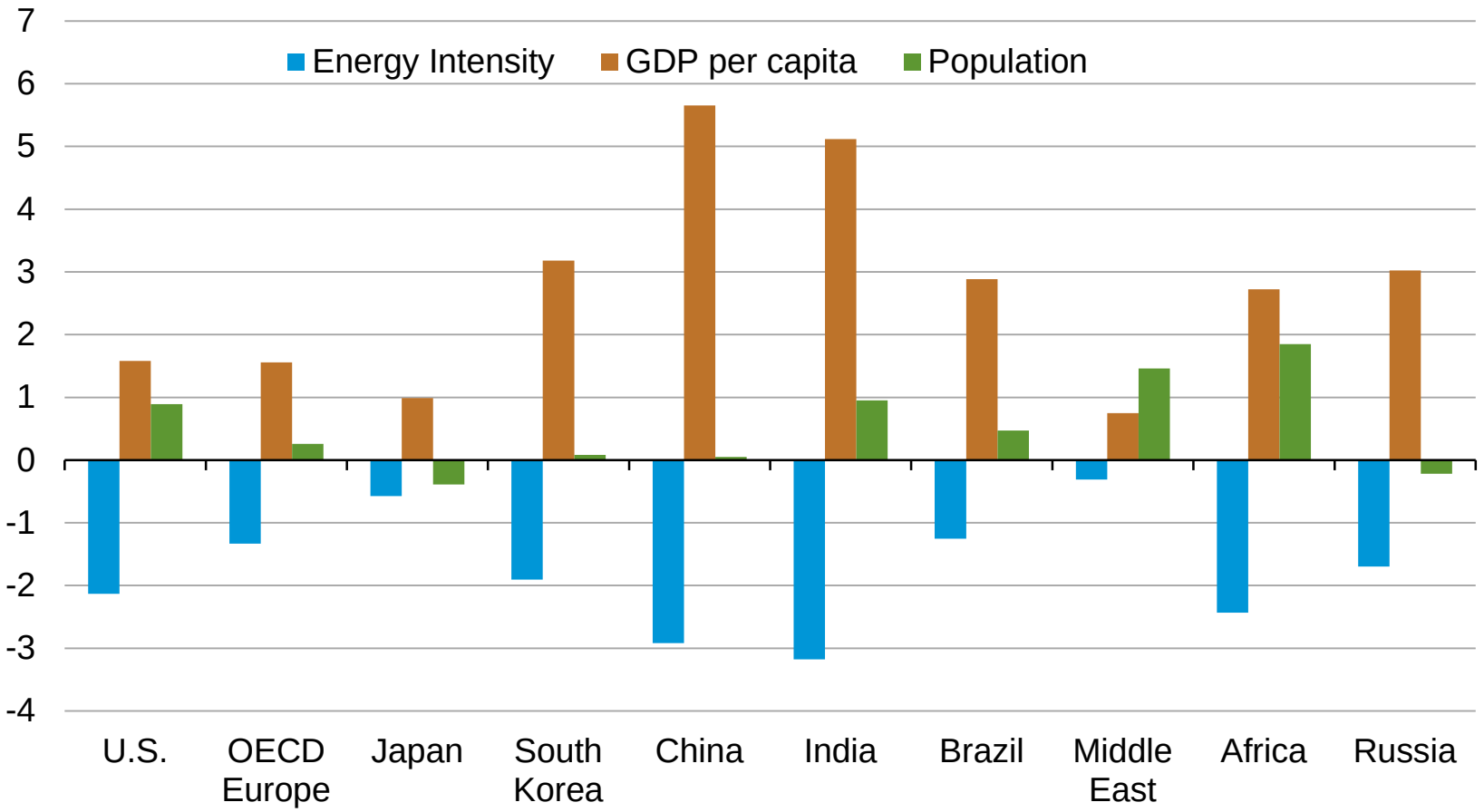
Source: EIA, Short-Term Energy Outlook, March 2014

Key findings of the EIA's International Energy Outlook 2013

- With world GDP rising by 3.6 percent per year, world energy use will grow by 56 percent between 2010 and 2040; half of the increase is attributed to China and India
- Renewable energy and nuclear power are the world's fastest-growing energy sources, each increasing by 2.5 percent per year; however, fossil fuels continue to supply almost 80 percent of world energy use through 2040
- Natural gas is the fastest growing fossil fuel in the outlook, supported by increasing supplies of shale gas, particularly in the United States
- Coal grows faster than petroleum consumption until after 2030, mostly due to increases in China's consumption of coal, and slow growth in oil demand in OECD member countries
- Given current policies and regulations, worldwide energy-related carbon dioxide emissions are projected to increase 46 percent by 2040, reaching 45 billion metric tons in 2040

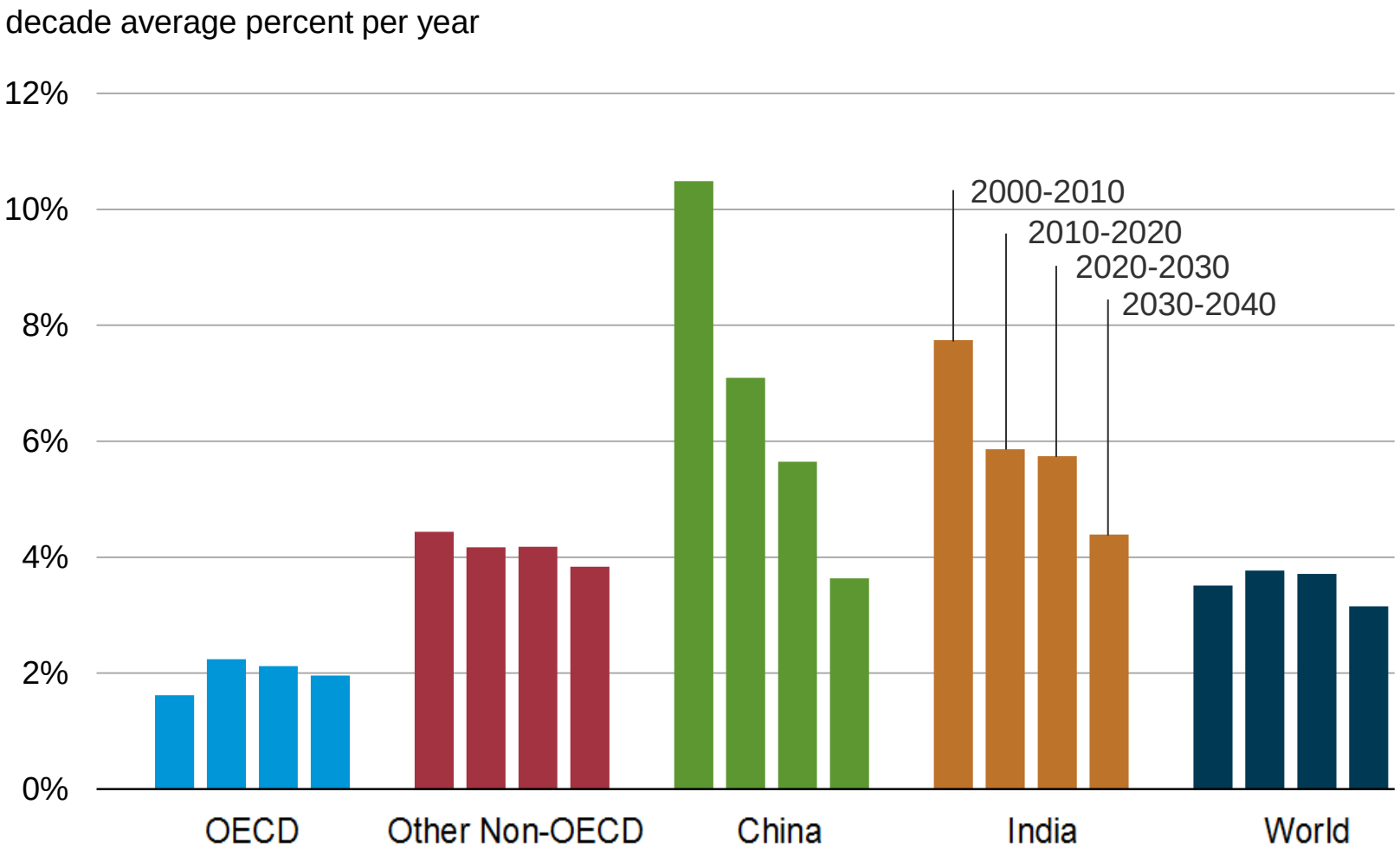
Economic activity and population drive increases in energy use; energy intensity improvements moderate this trend

average annual change (2010-2040)
percent per year



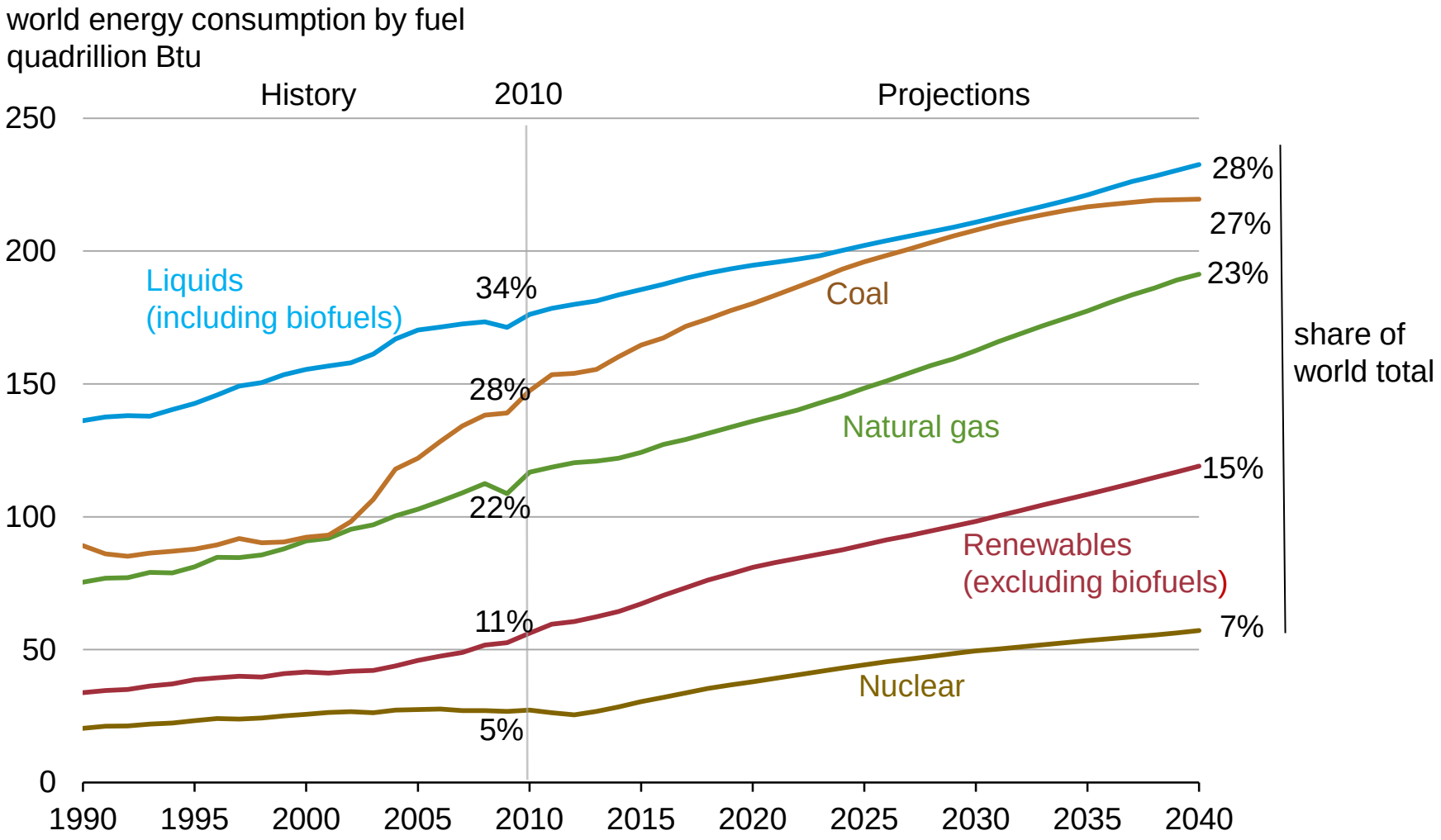
Source: EIA, International Energy Outlook 2013

Regional 10-year real GDP growth rates



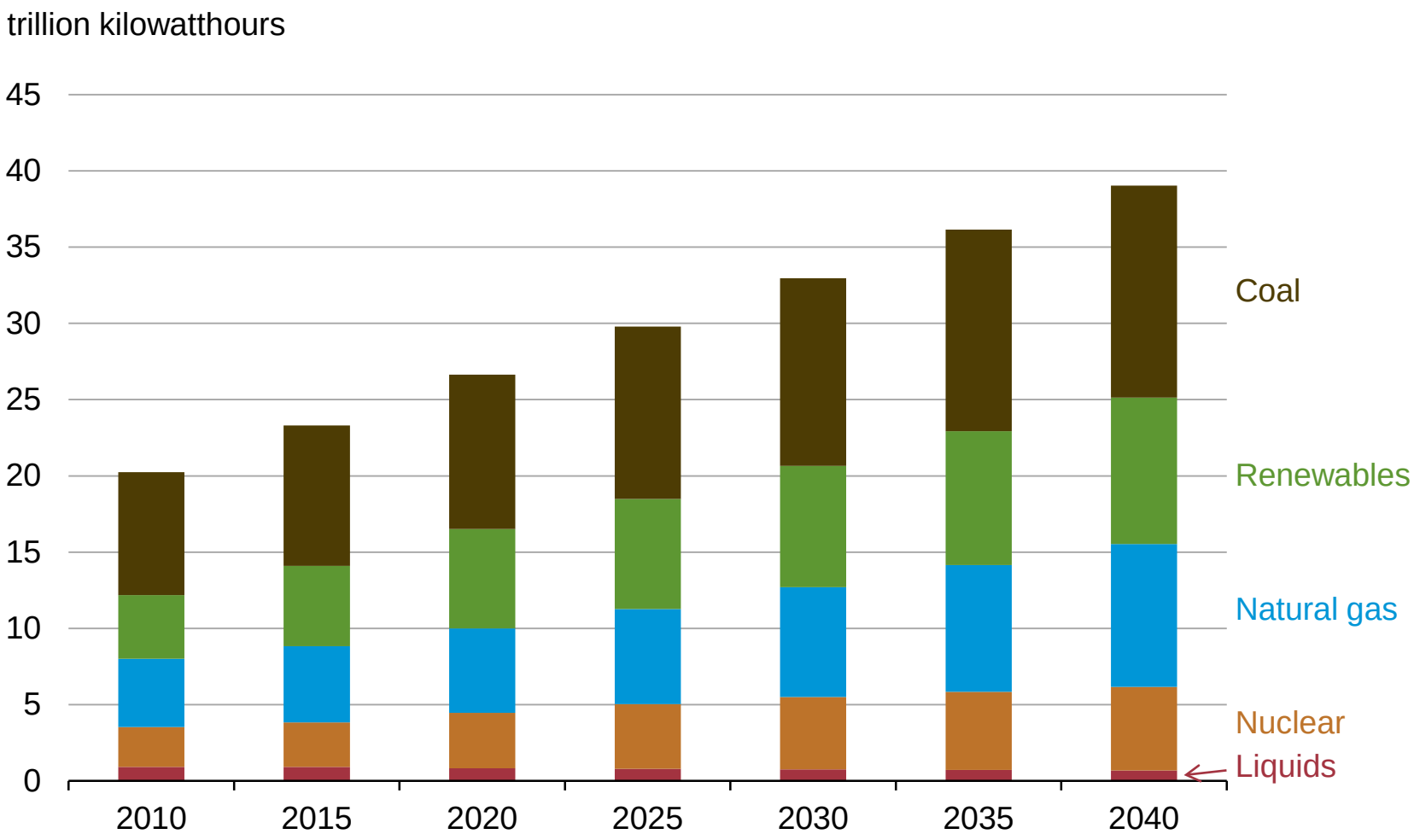
Source: EIA, International Energy Outlook 2013

Renewable energy and nuclear power are the fastest growing source of world energy consumption out to 2040



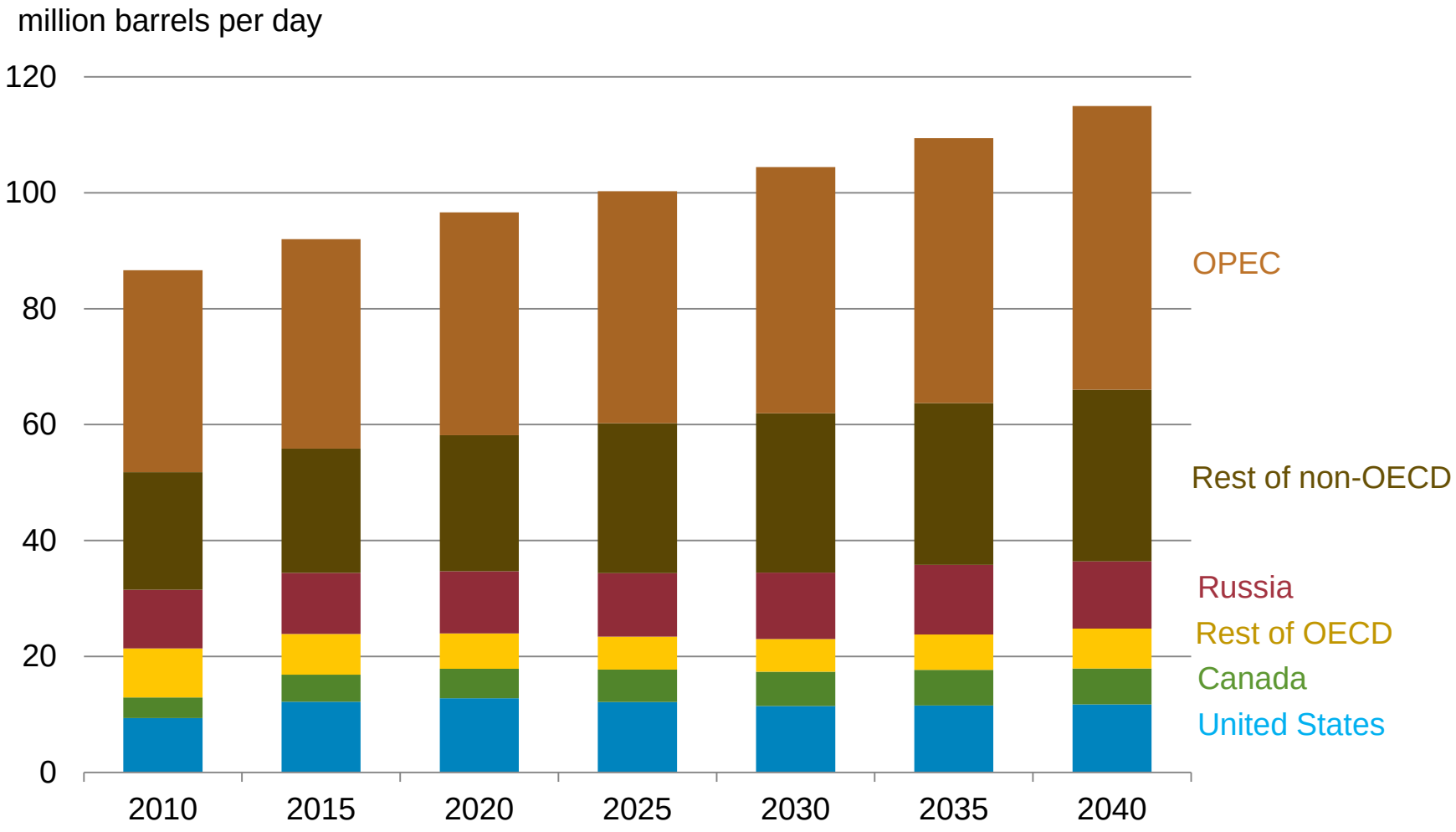
Source: EIA, International Energy Outlook 2013

World net electricity generation continues to be led by coal



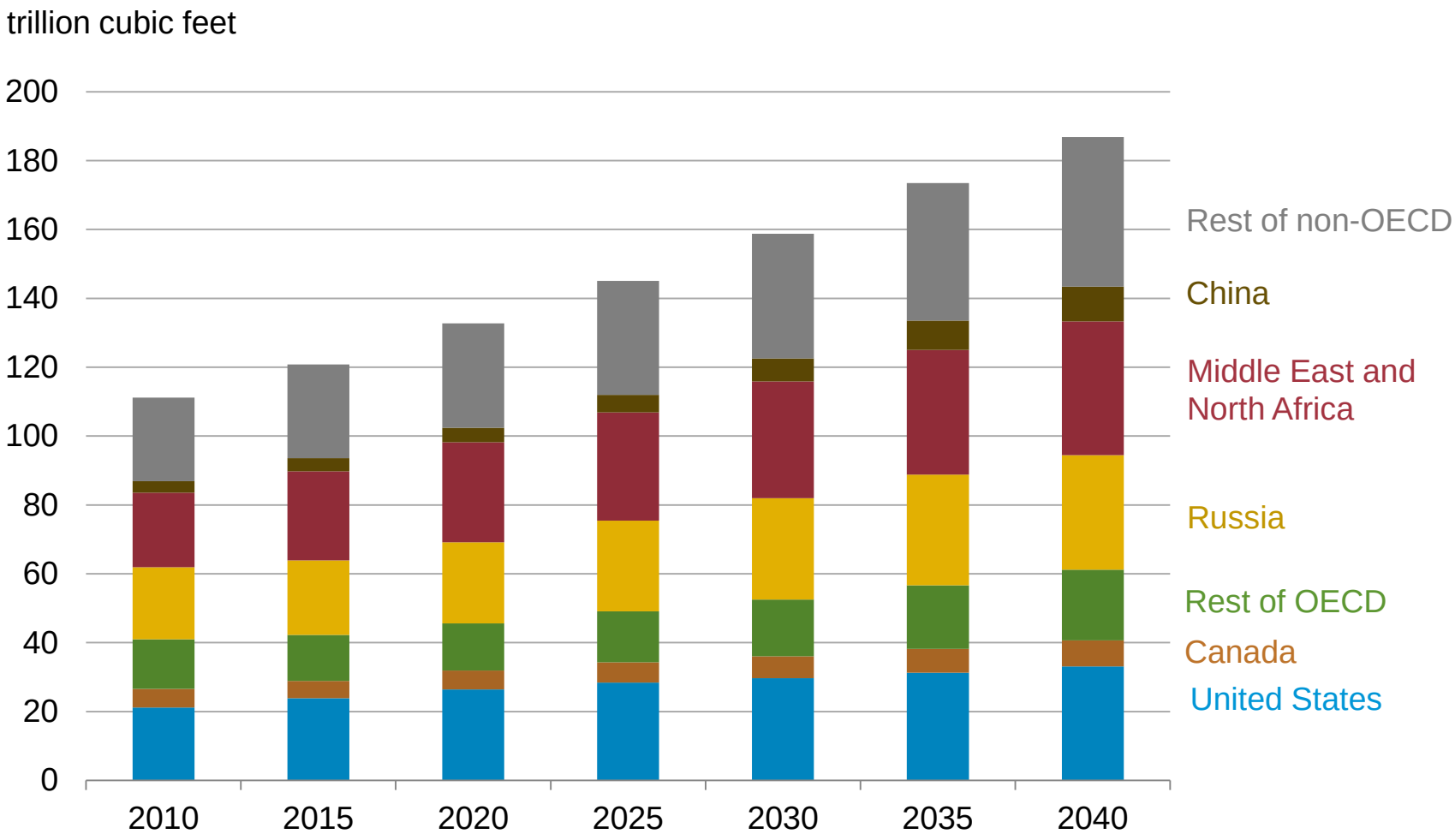
Source: EIA, International Energy Outlook 2013

World petroleum and other liquids production exceeds 100 MMbbl/d after 2025



Source: EIA, International Energy Outlook 2013

World natural gas production to keep growing



Source: EIA, International Energy Outlook 2013

Top ten 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**

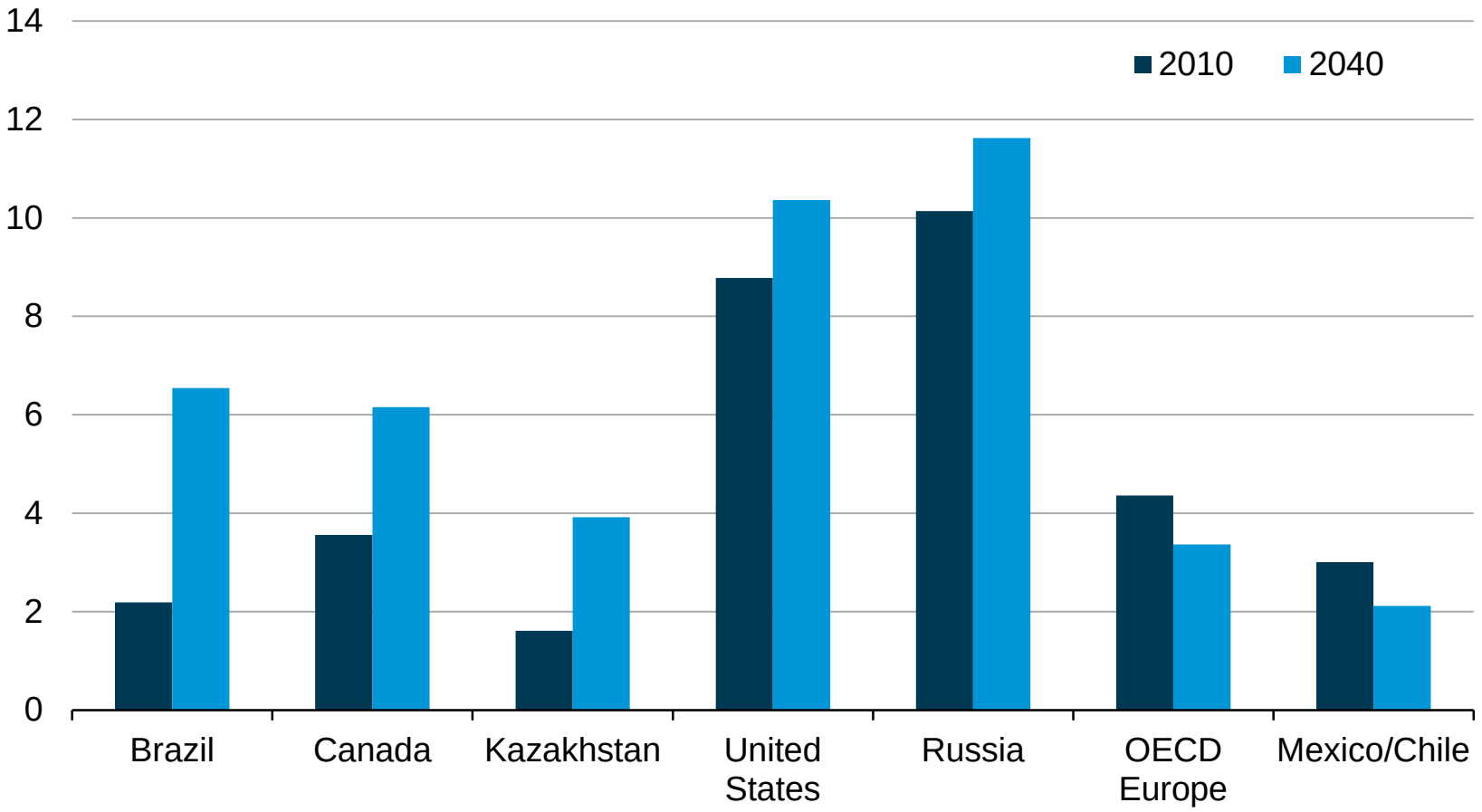
Note: ARI estimates U.S. shale oil resources at 48 billion barrels and U.S. shale gas resources at 1,161 trillion cubic feet.

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

Non-OPEC oil supply growth is concentrated in five countries

non-OPEC petroleum production

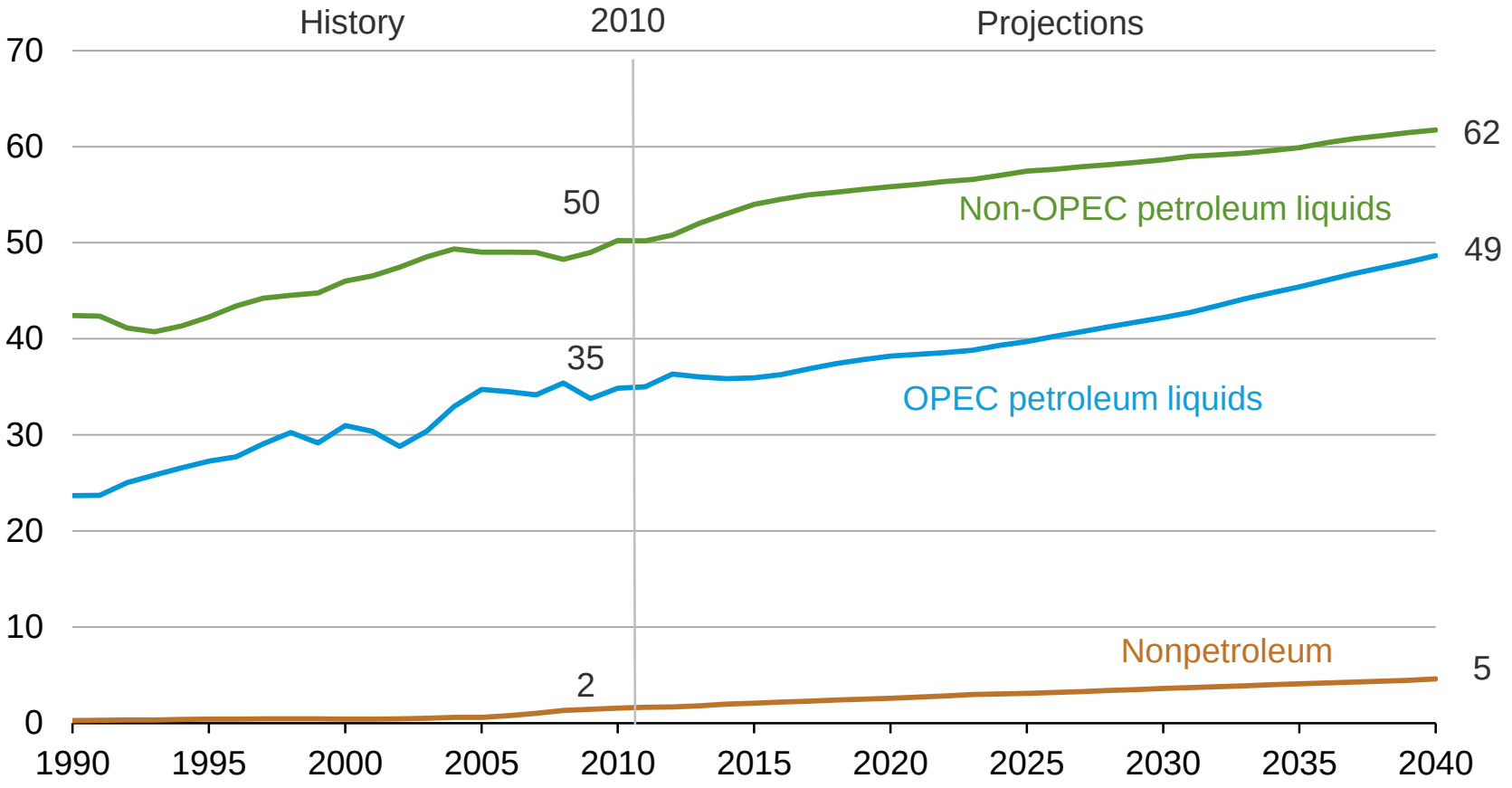
million barrels per day



Source: EIA, International Energy Outlook 2013

OPEC market share grows after 2025

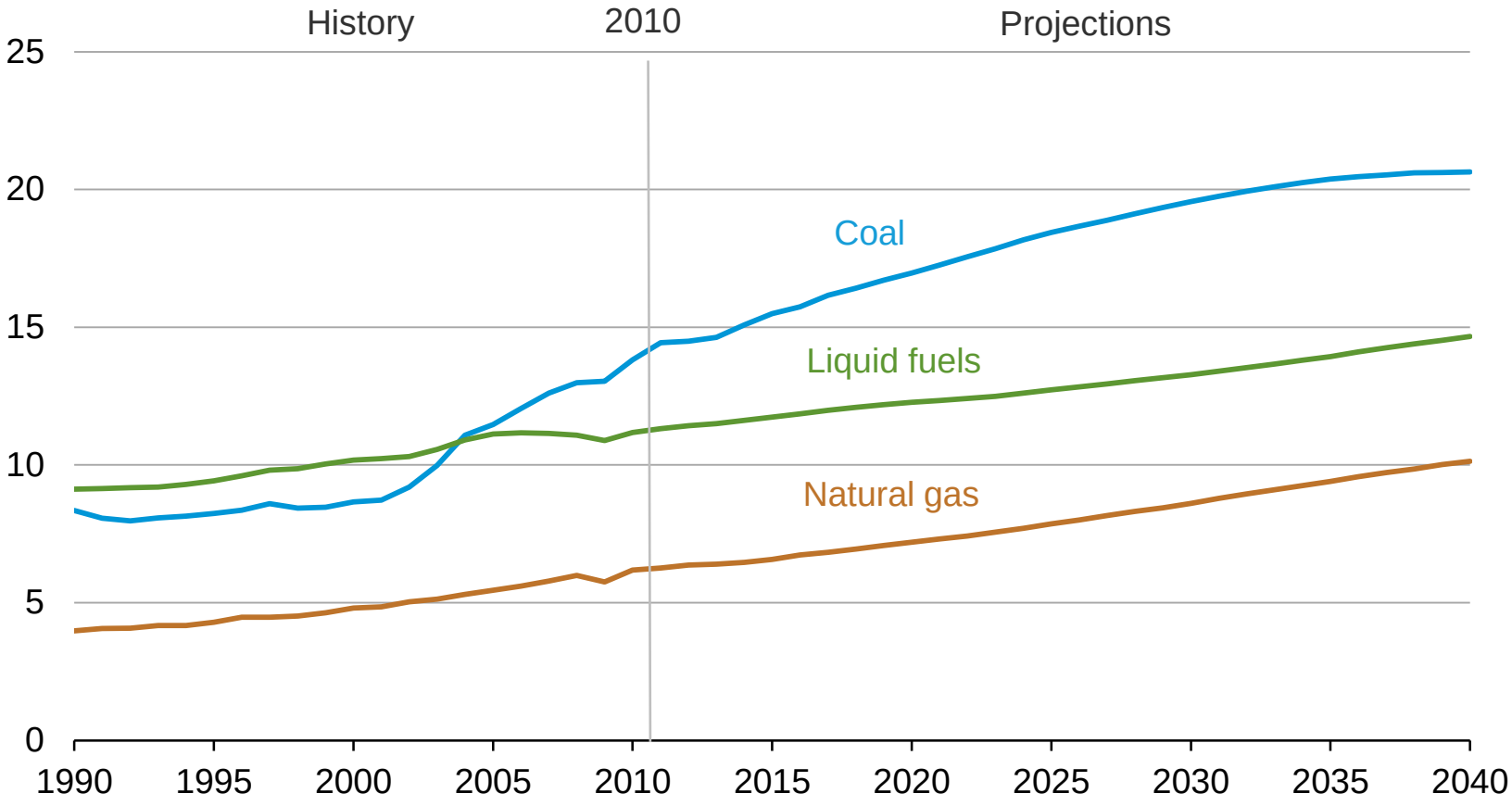
world liquids production
million barrels per day



Source: EIA, International Energy Outlook 2013

World energy-related carbon dioxide emissions continue to grow

carbon dioxide emissions
billion metric tons



Source: EIA, International Energy Outlook 2013

For more information

U.S. Energy Information Administration home page | www.eia.gov

Annual Energy Outlook | www.eia.gov/aeo

Short-Term Energy Outlook | www.eia.gov/steo

International Energy Outlook | www.eia.gov/ieo

Monthly Energy Review | www.eia.gov/mer

Today in Energy | www.eia.gov/todayinenergy

State Energy Portal | www.eia.gov/state

Drilling Productivity Report | www.eia.gov/petroleum/drilling/