U.S. Energy Outlook

Harvard University
John F. Kennedy School of Government
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By
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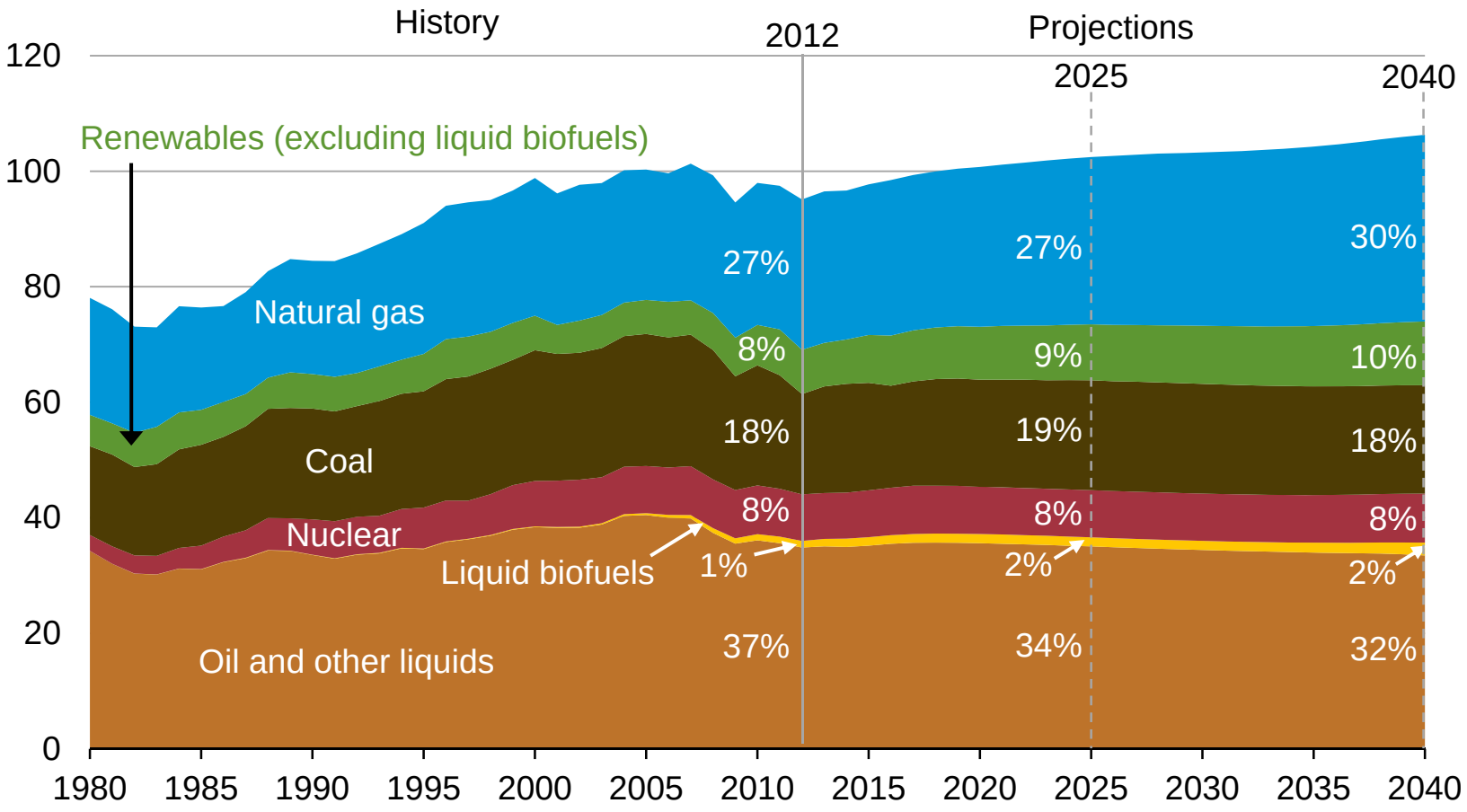
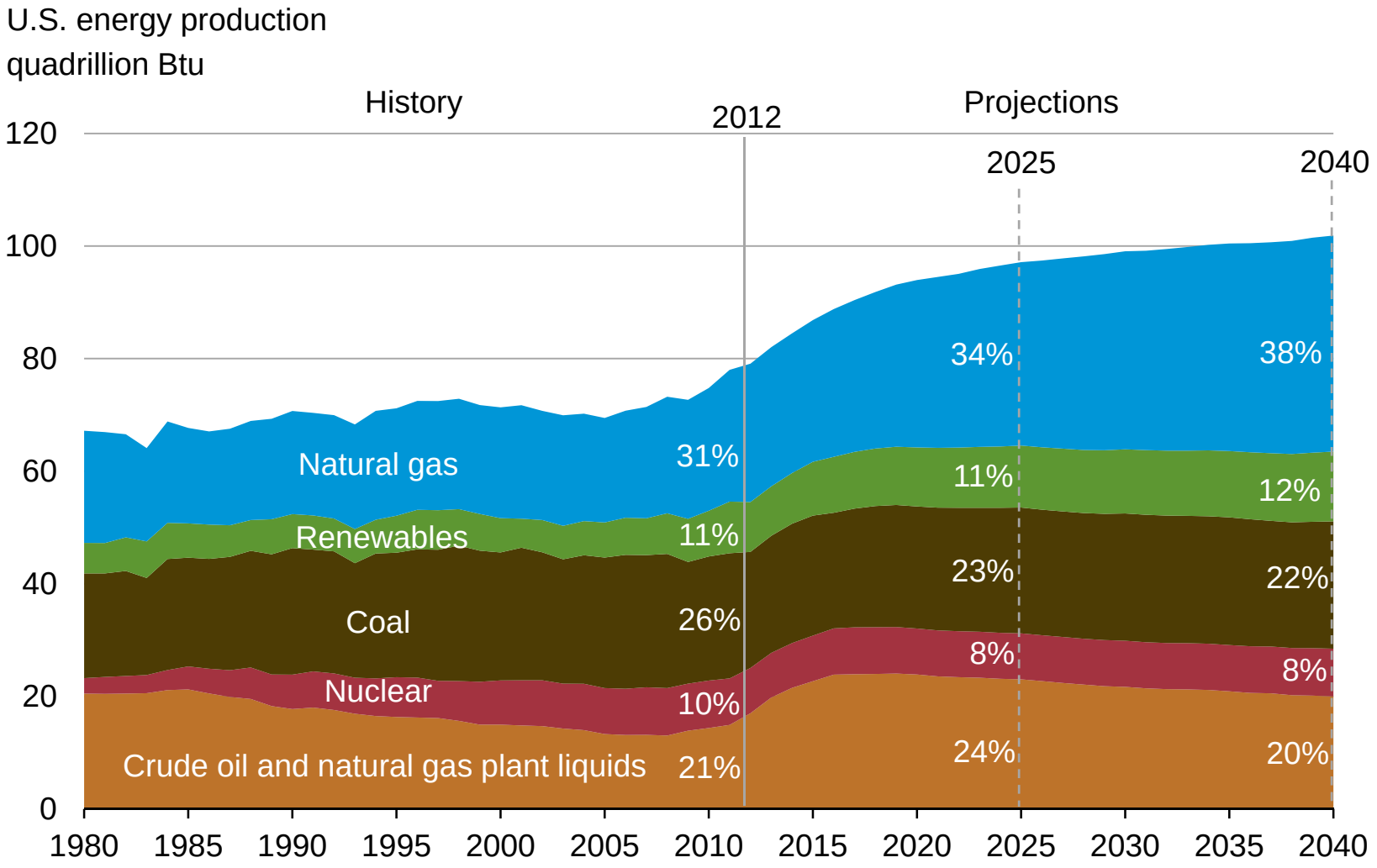
U.S. energy use grows slowly over the projection reflecting steady growth in GDP offset by improving energy efficiency

U.S. primary energy consumption
quadrillion Btu



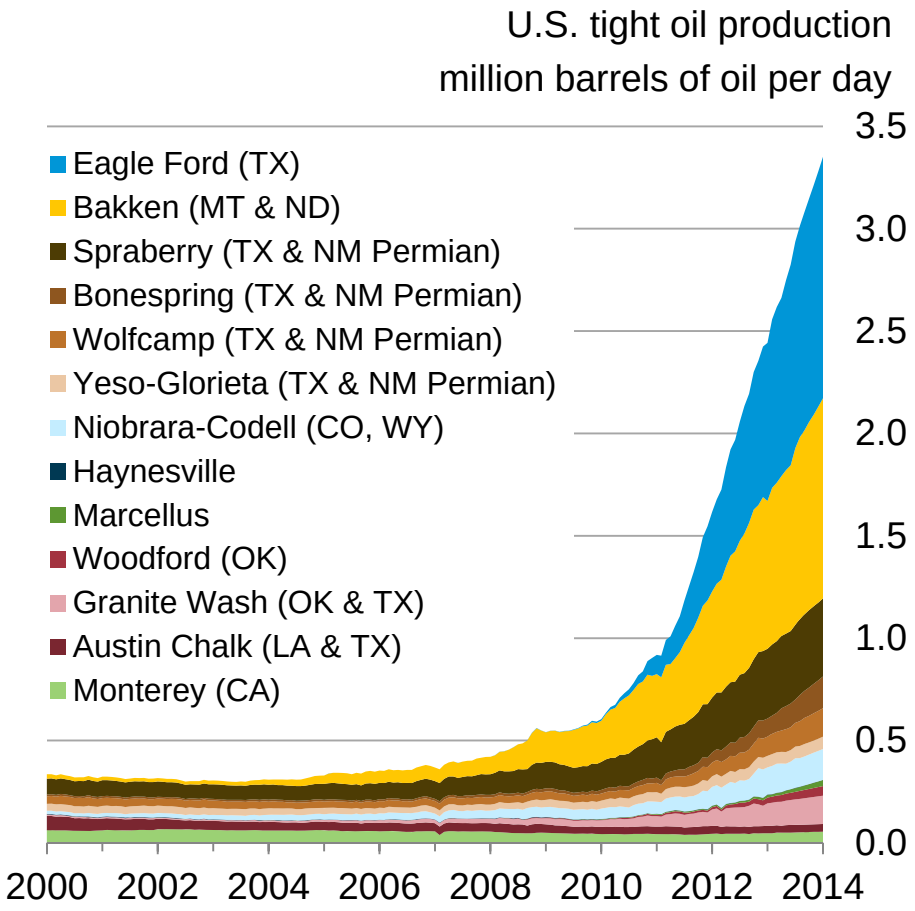
Source: EIA, Annual Energy Outlook 2014 Early Release

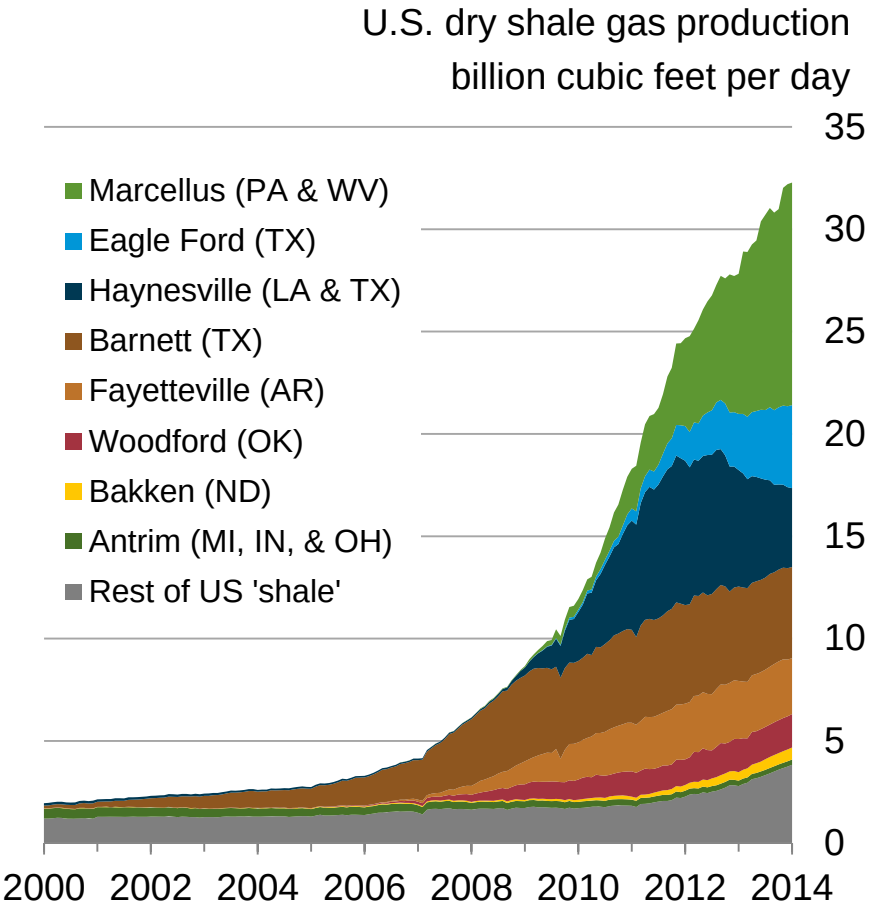
U.S. production grows rapidly, particularly natural gas, renewables, and liquids in the near term



Source: EIA, Annual Energy Outlook 2014 Early Release

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



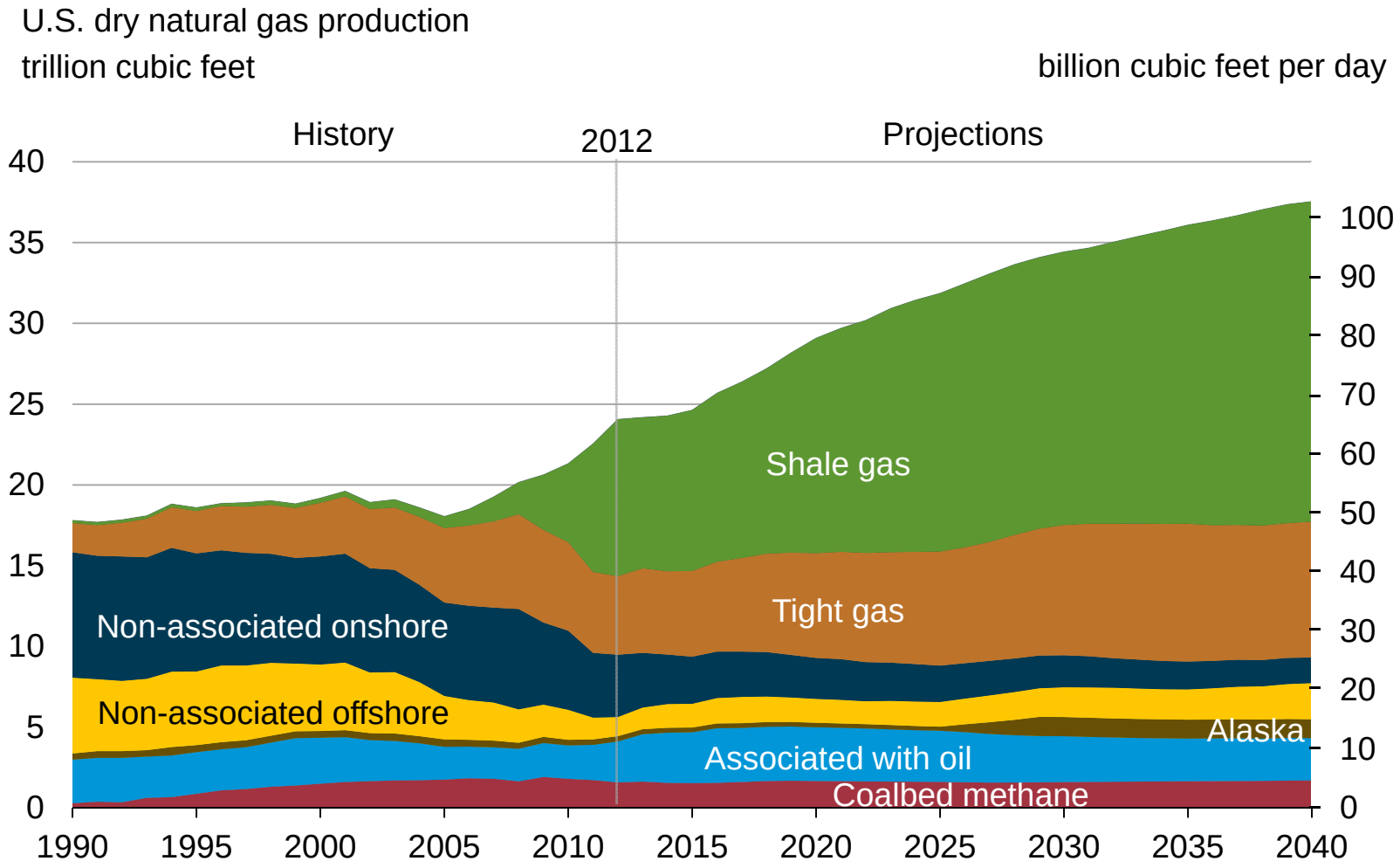


Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through January 2014 and represent EIA's official tight oil & shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).

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

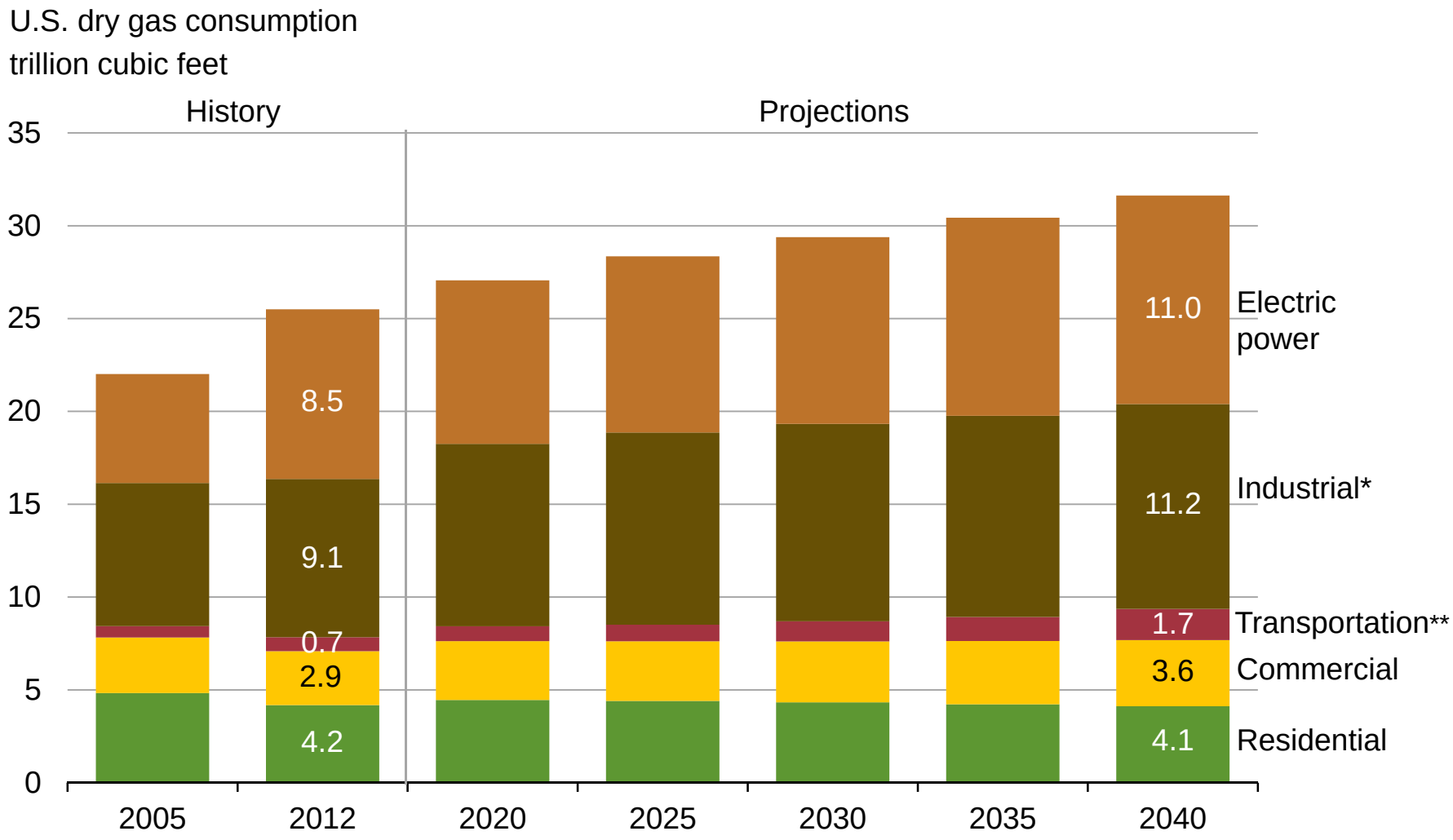
- Refinery operations/investment
- Logistics infrastructure investment
- Exports of petroleum products
- Exports of crude oil and natural gas (LNG)
- Operation of the Strategic Petroleum Reserve

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

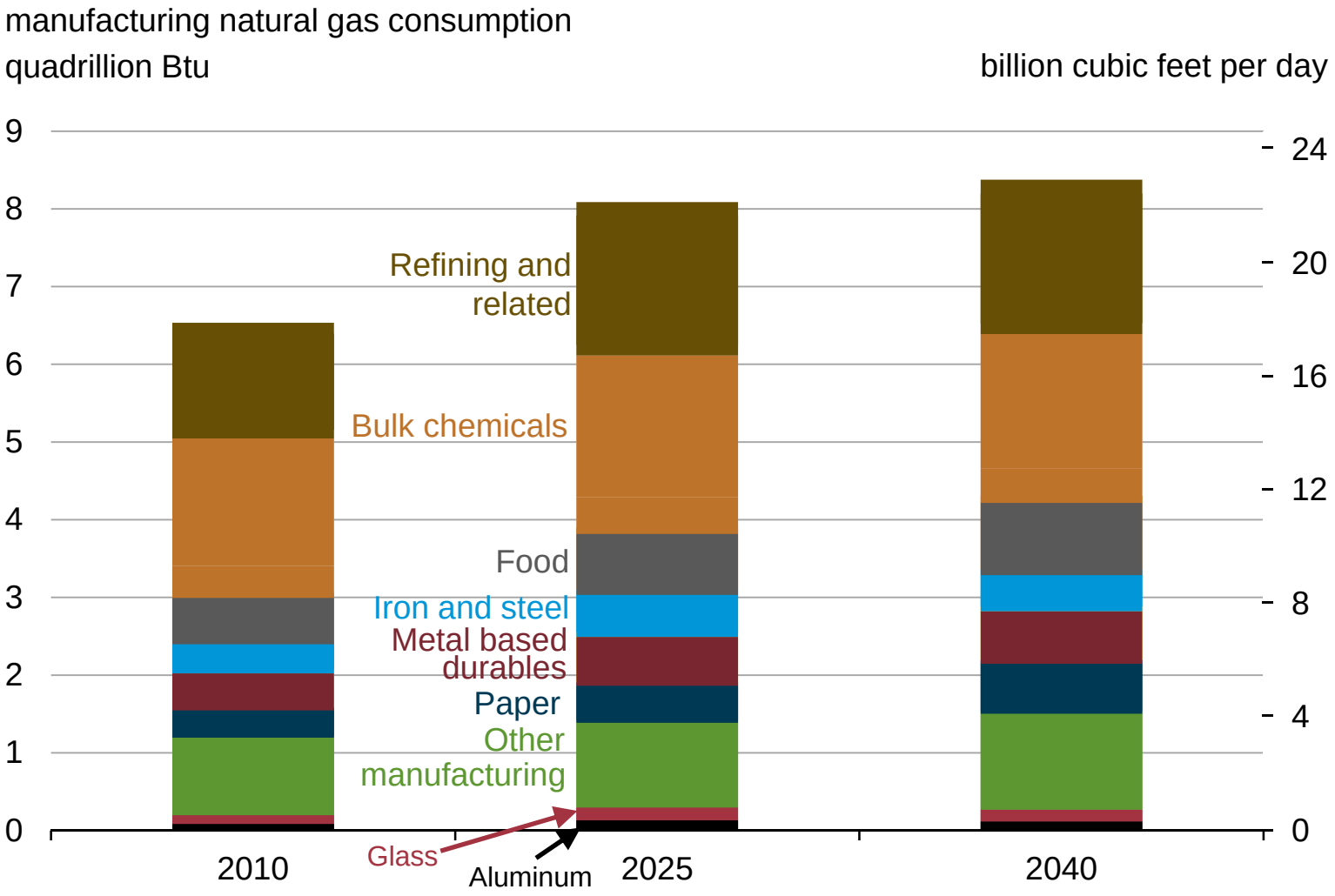
U.S. natural gas consumption growth is driven by electric power, industrial, and transportation use



Source: EIA, Annual Energy Outlook 2014 Early Release

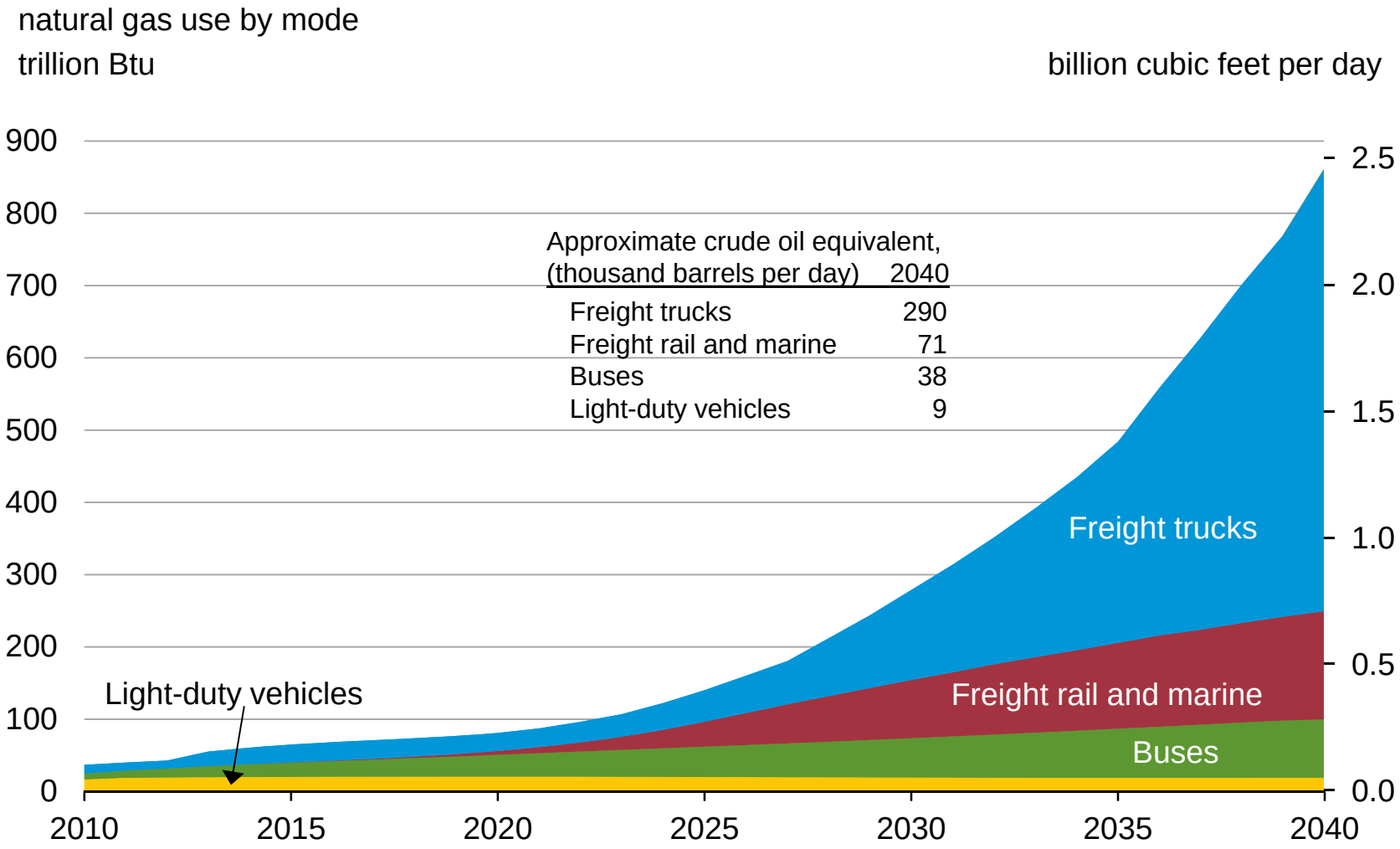
**Includes combined heat-and-power and lease and plant fuel*
***Includes pipeline fuel*

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



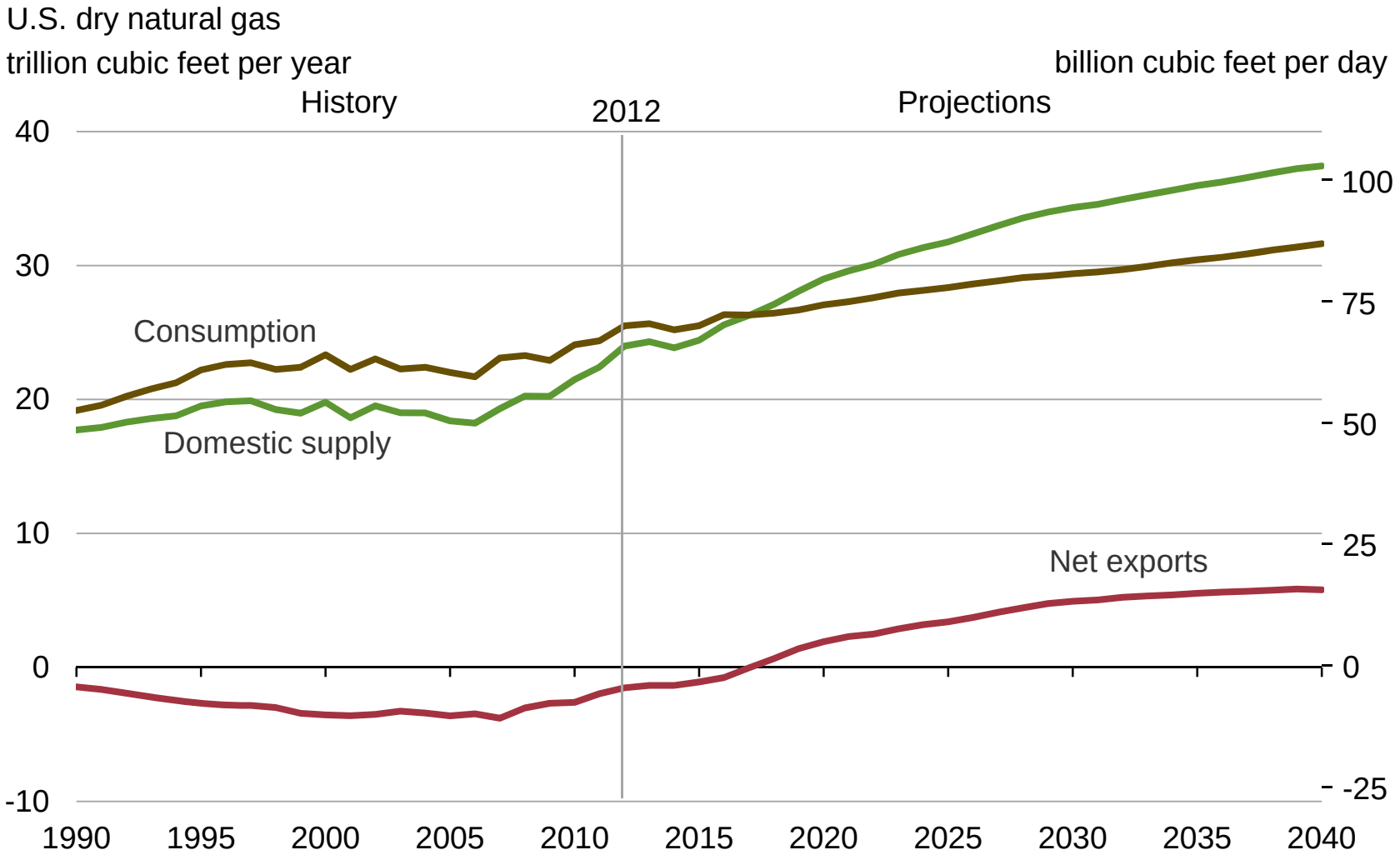
Source: EIA, Annual Energy Outlook 2014 Early Release

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



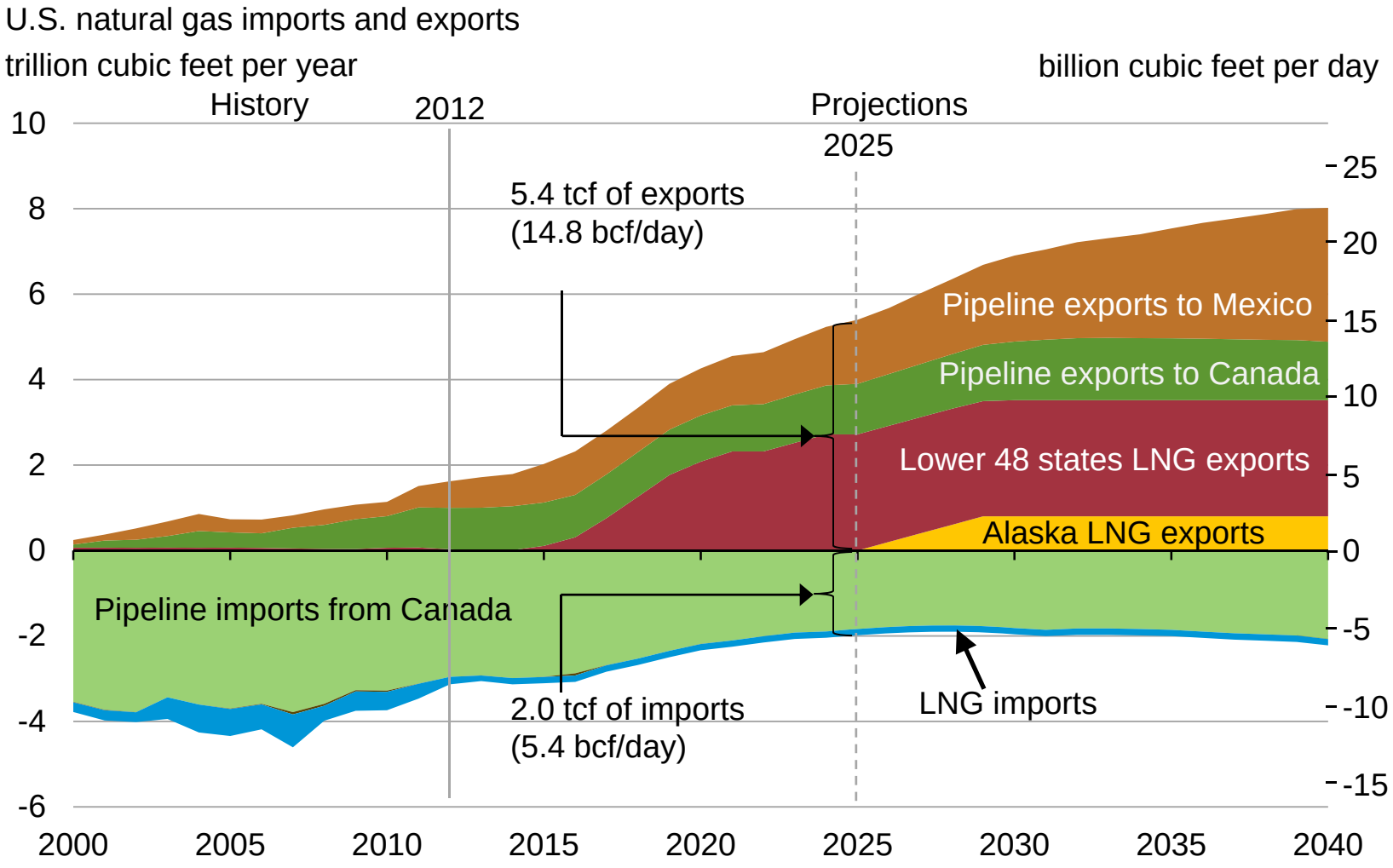
Source: EIA, Annual Energy Outlook 2014 Early Release

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



Source: EIA, Annual Energy Outlook 2014 Early Release

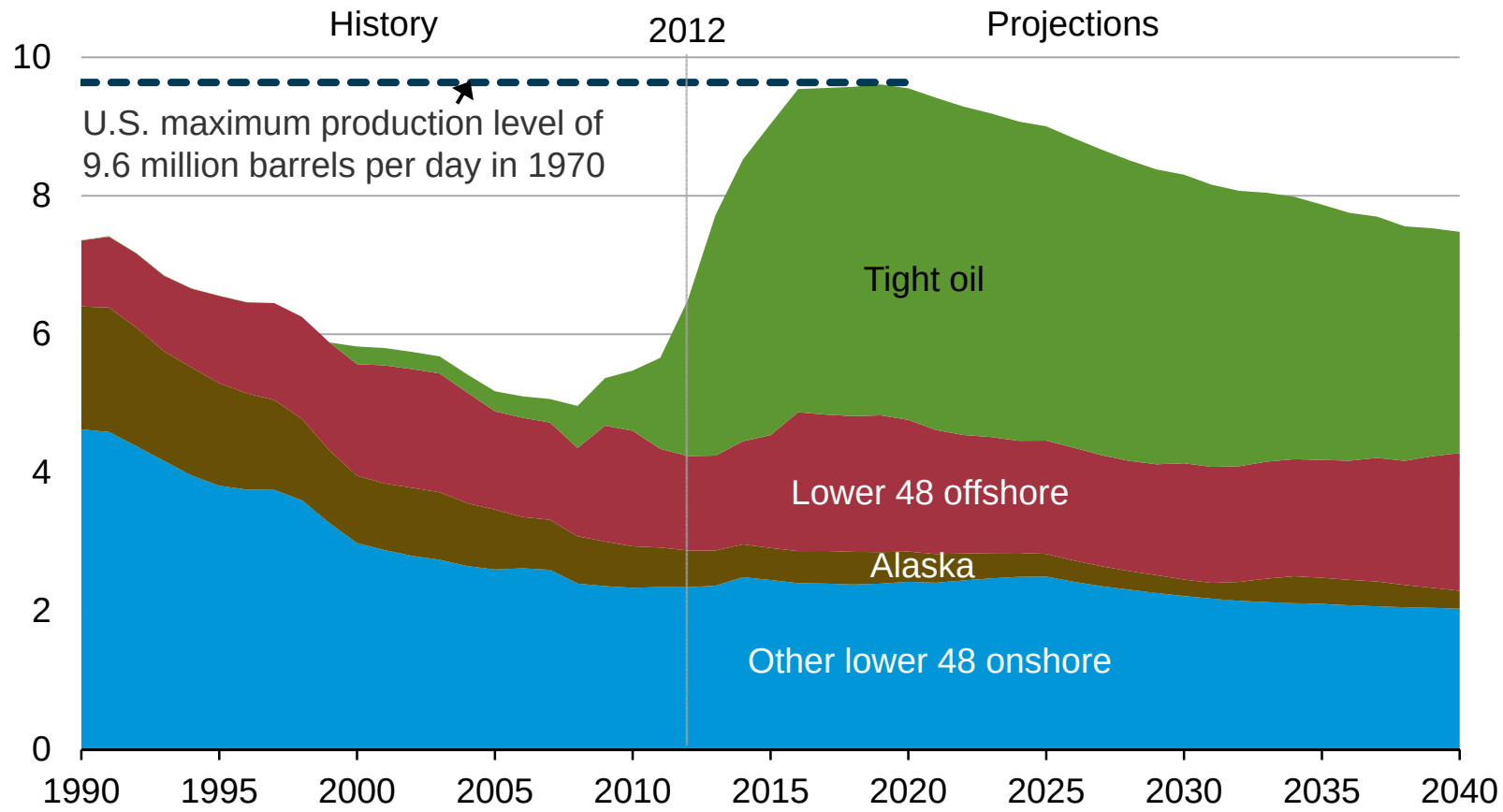
U.S. natural gas gross exports exceed 5 tcf in 2025



Source: EIA, Annual Energy Outlook 2014 Early Release

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

U.S. crude oil production
million barrels per day

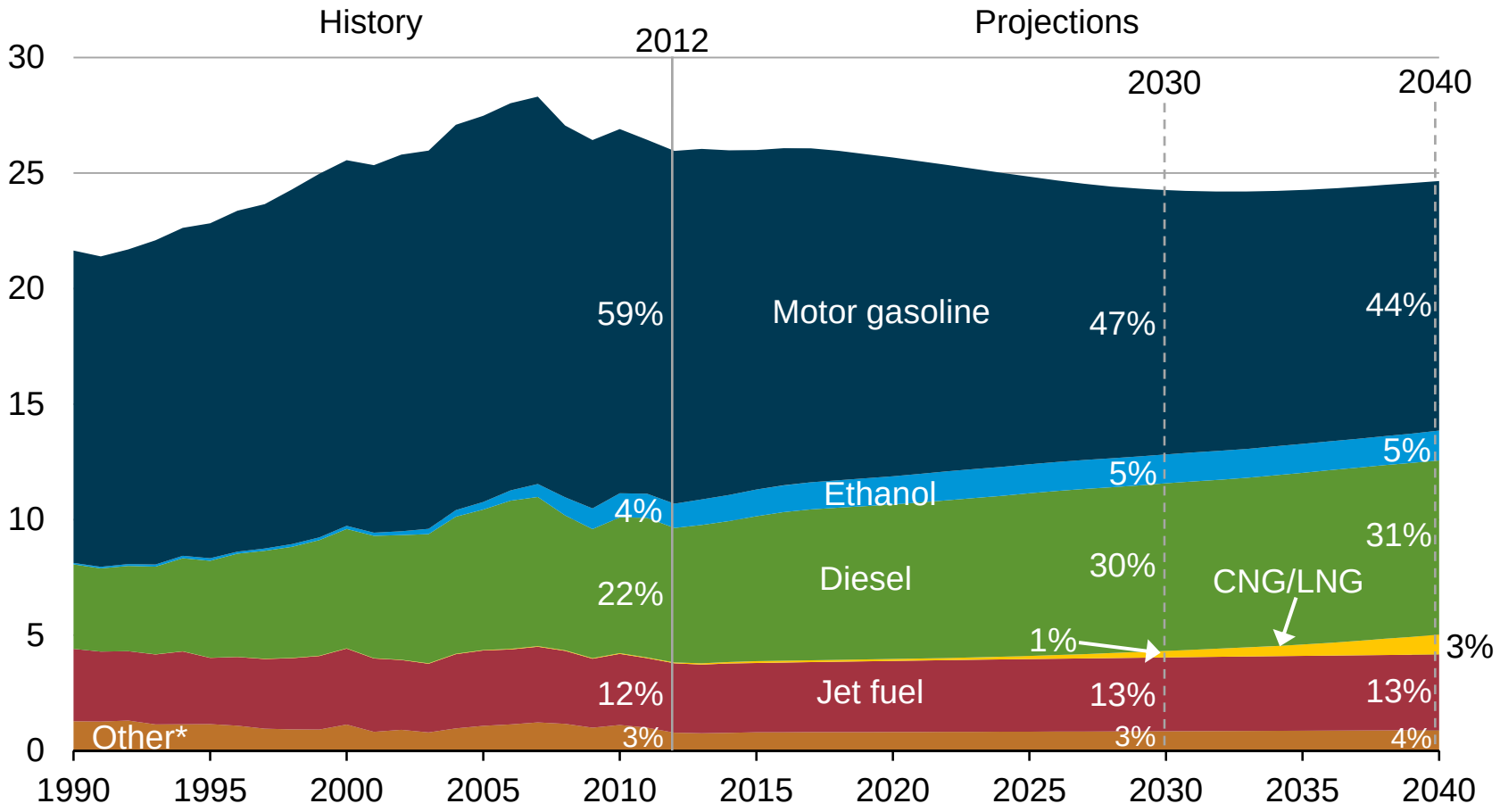


Source: EIA, Annual Energy Outlook 2014 Early Release

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

transportation energy consumption by fuel

quadrillion Btu



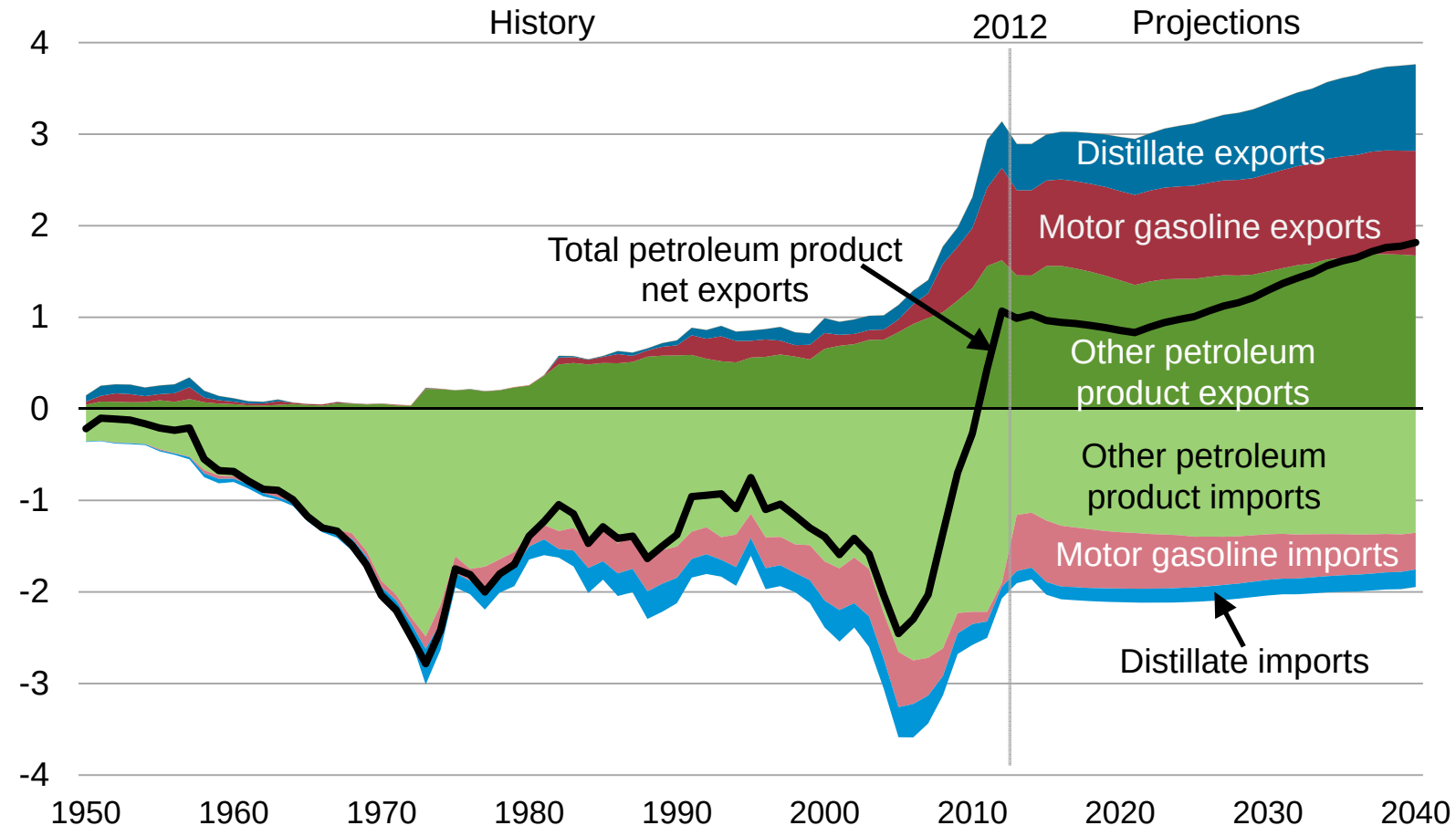
Source: EIA, Annual Energy Outlook 2014 Early Release

**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

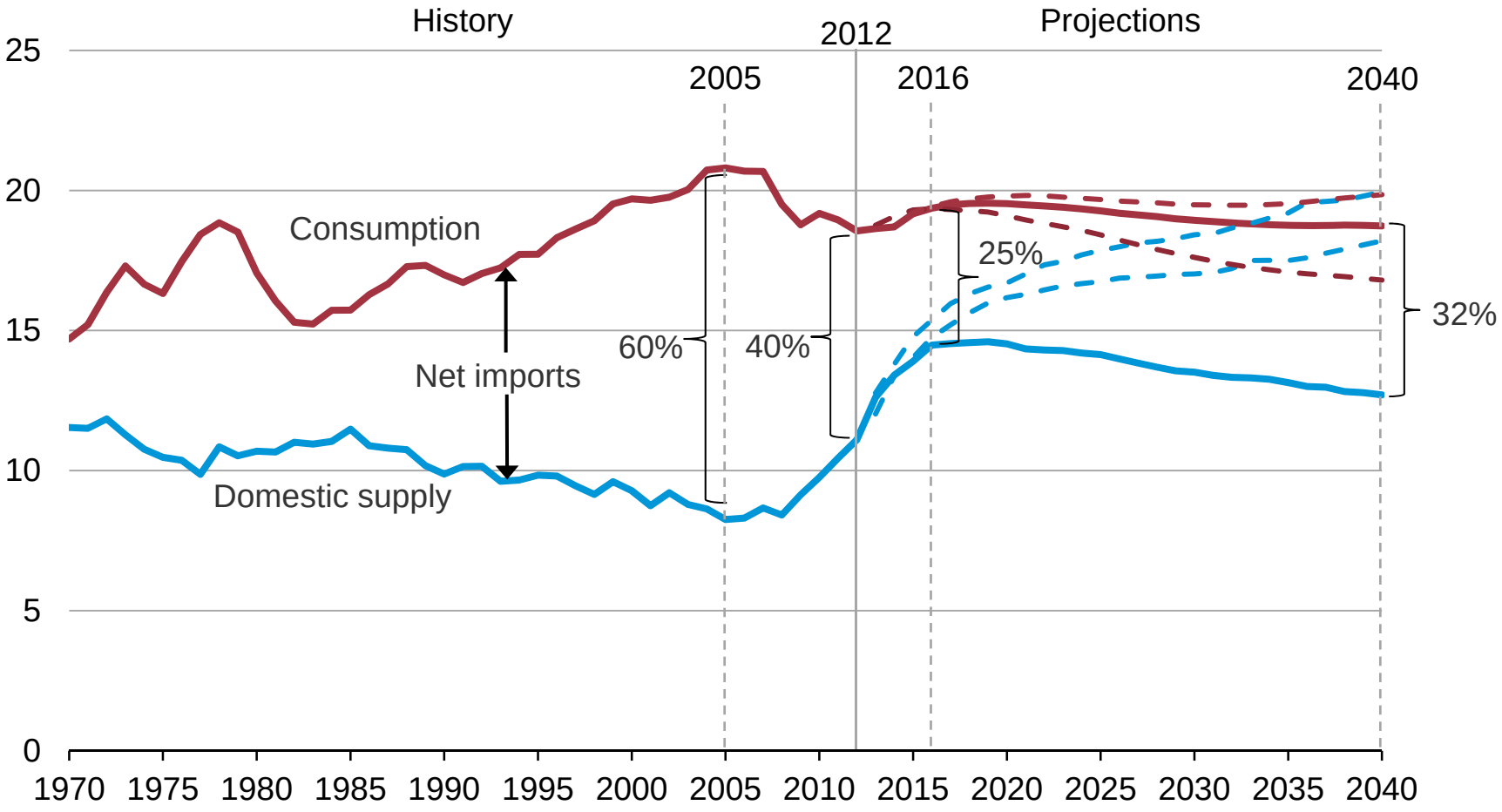
million barrels per day



Source: EIA, Annual Energy Outlook 2014 Early Release

U.S. dependence on imported liquids declines, particularly in the near term

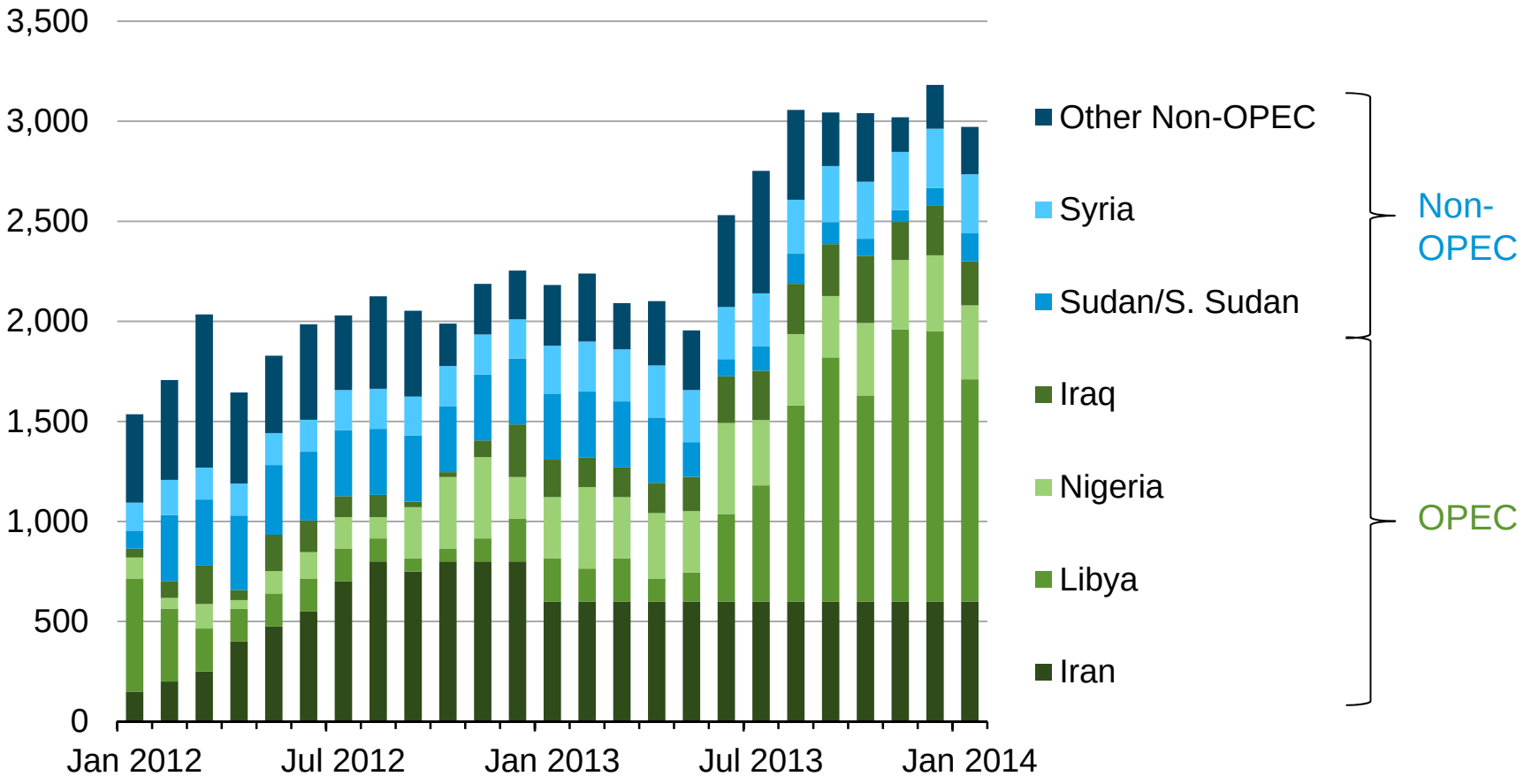
U.S. liquid fuel supply
million barrels per day



Source: EIA, Annual Energy Outlook 2014 Reference case and draft analysis

OPEC countries now account for most unplanned outages

estimated unplanned crude oil production outages
thousand barrels per day



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

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

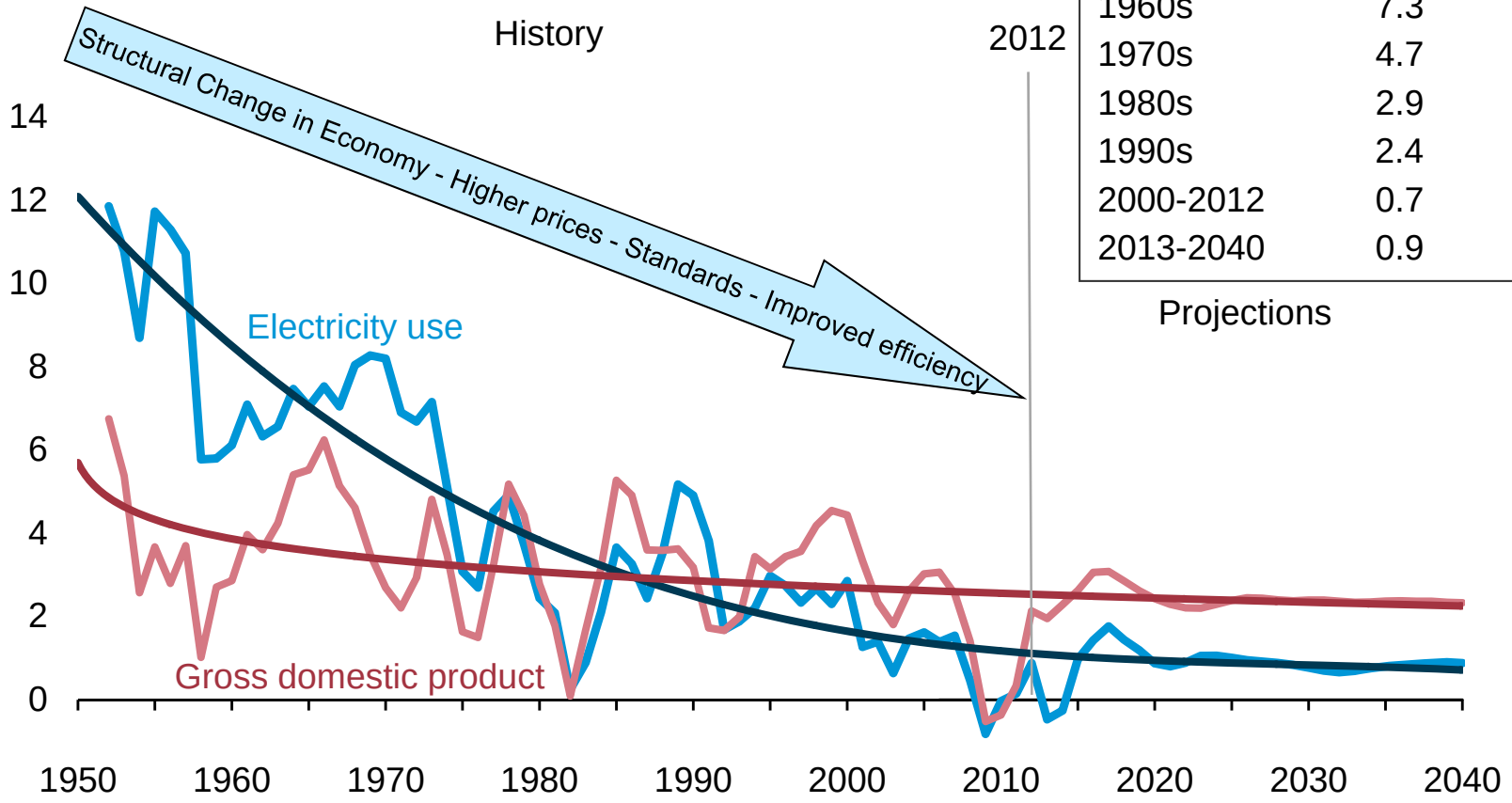
Today in Energy | www.eia.gov/todayinenergy

State Energy Profiles | www.eia.gov/state

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

Growth in electricity use slows, but still increases by 29% from 2012 to 2040

U.S. electricity use
percent growth (3-year rolling average)

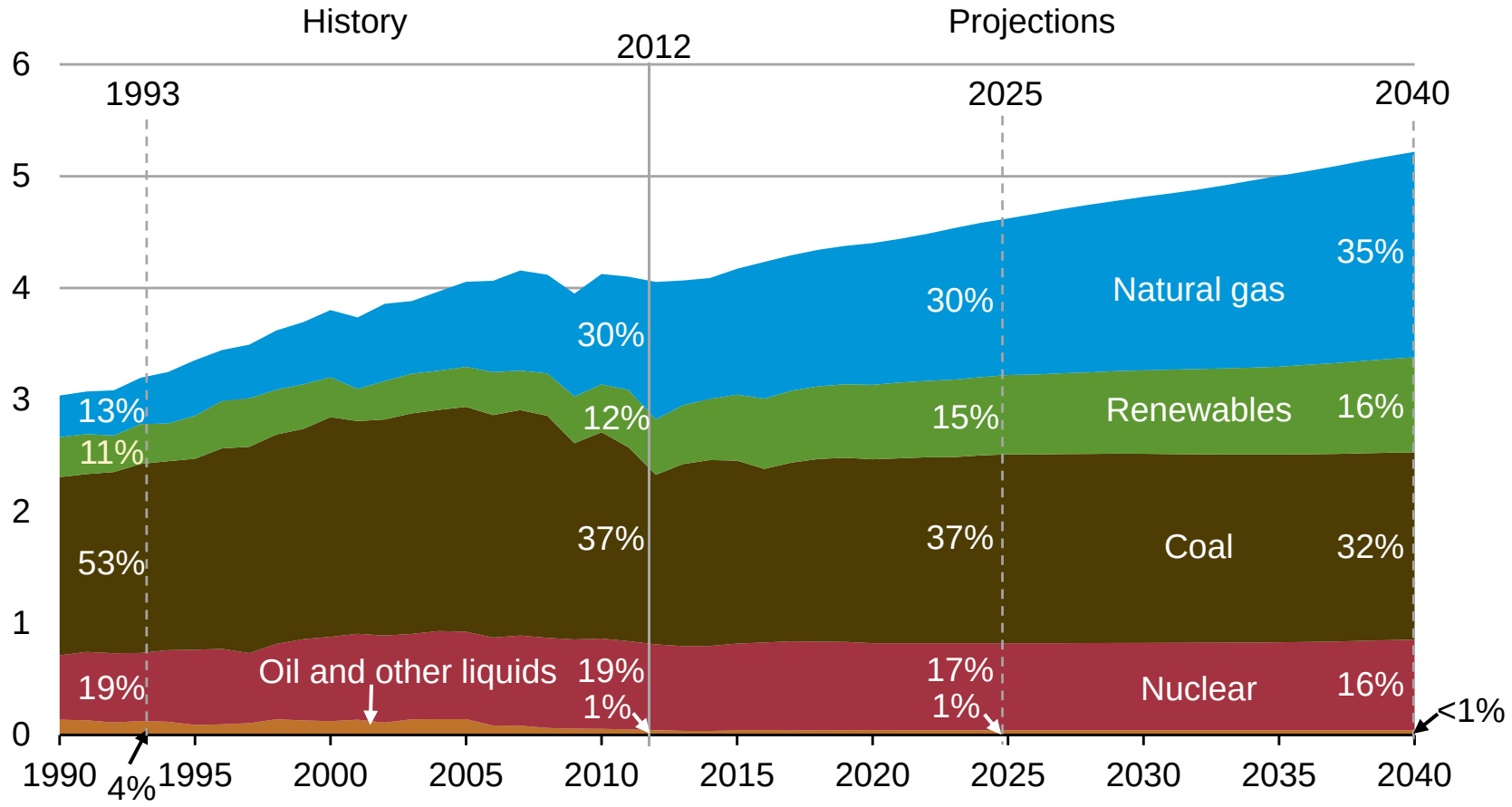


Period	Annual Growth	
	Electricity use	GDP
1950s	9.8	4.1
1960s	7.3	4.4
1970s	4.7	3.2
1980s	2.9	3.0
1990s	2.4	3.2
2000-2012	0.7	1.8
2013-2040	0.9	2.4

Source: EIA, Annual Energy Outlook 2014 Early Release

Over time the electricity mix gradually shifts to lower-carbon options, led by growth in natural gas and renewable generation

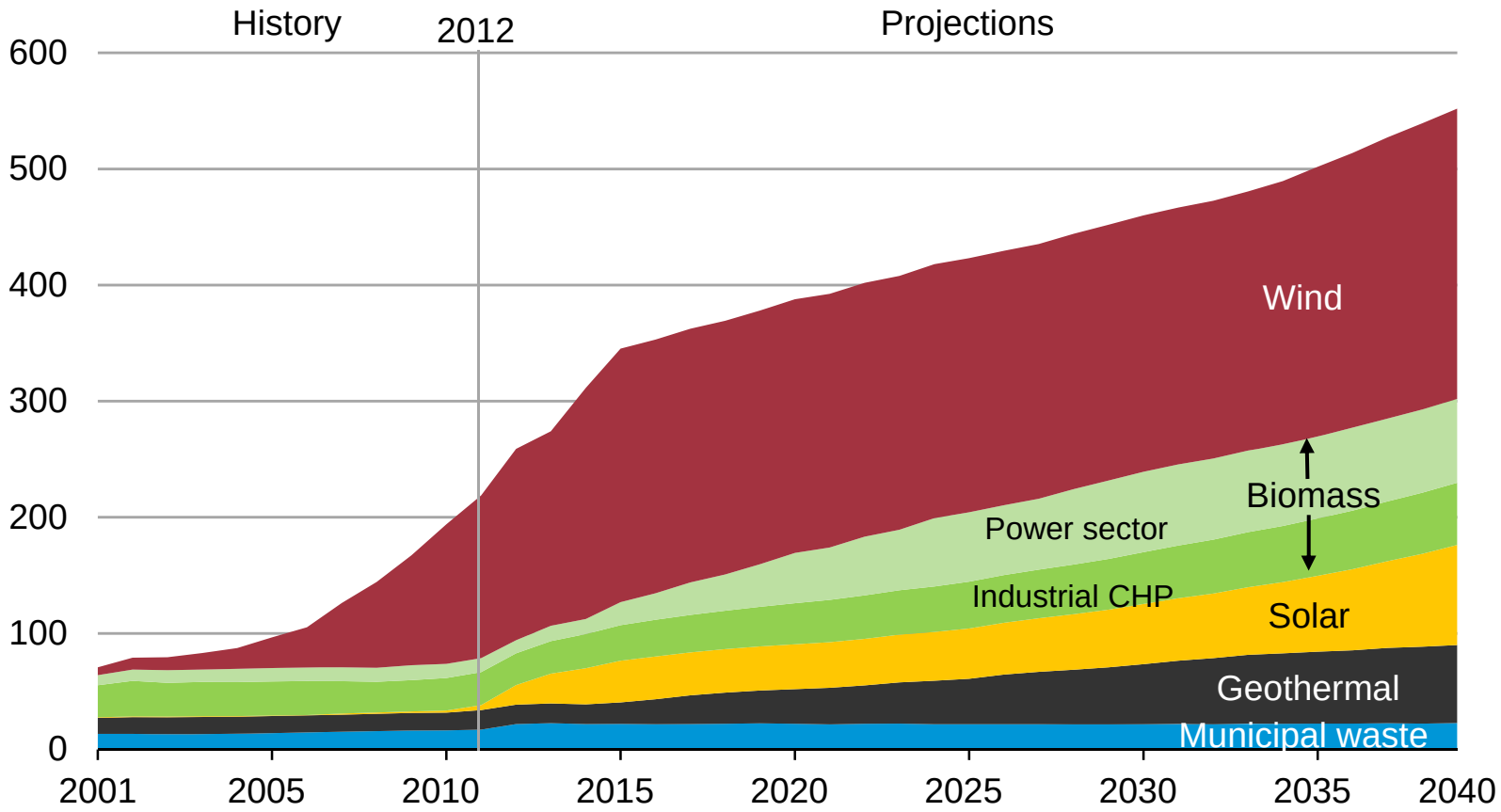
electricity net generation
trillion kilowatthours per year



Source: EIA, Annual Energy Outlook 2014 Early Release

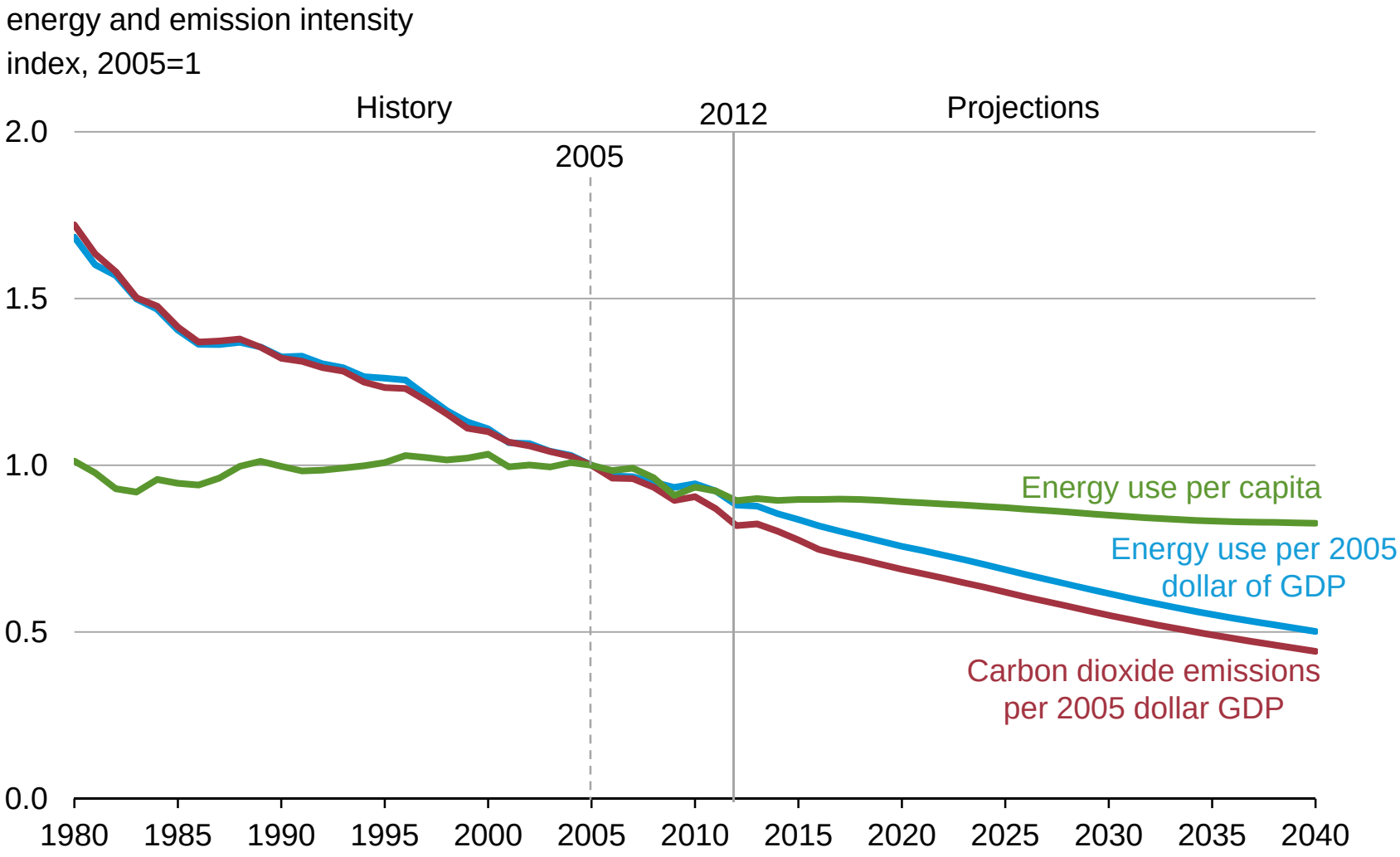
Non-hydro renewable generation more than doubles between 2012 and 2040

non-hydropower renewable generation
billion kilowatthours per year



Source: EIA, Annual Energy Outlook 2013 Early Release

CO_2 per dollar of GDP declines faster than energy use per dollar of GDP reflecting the shift to lower carbon fuels

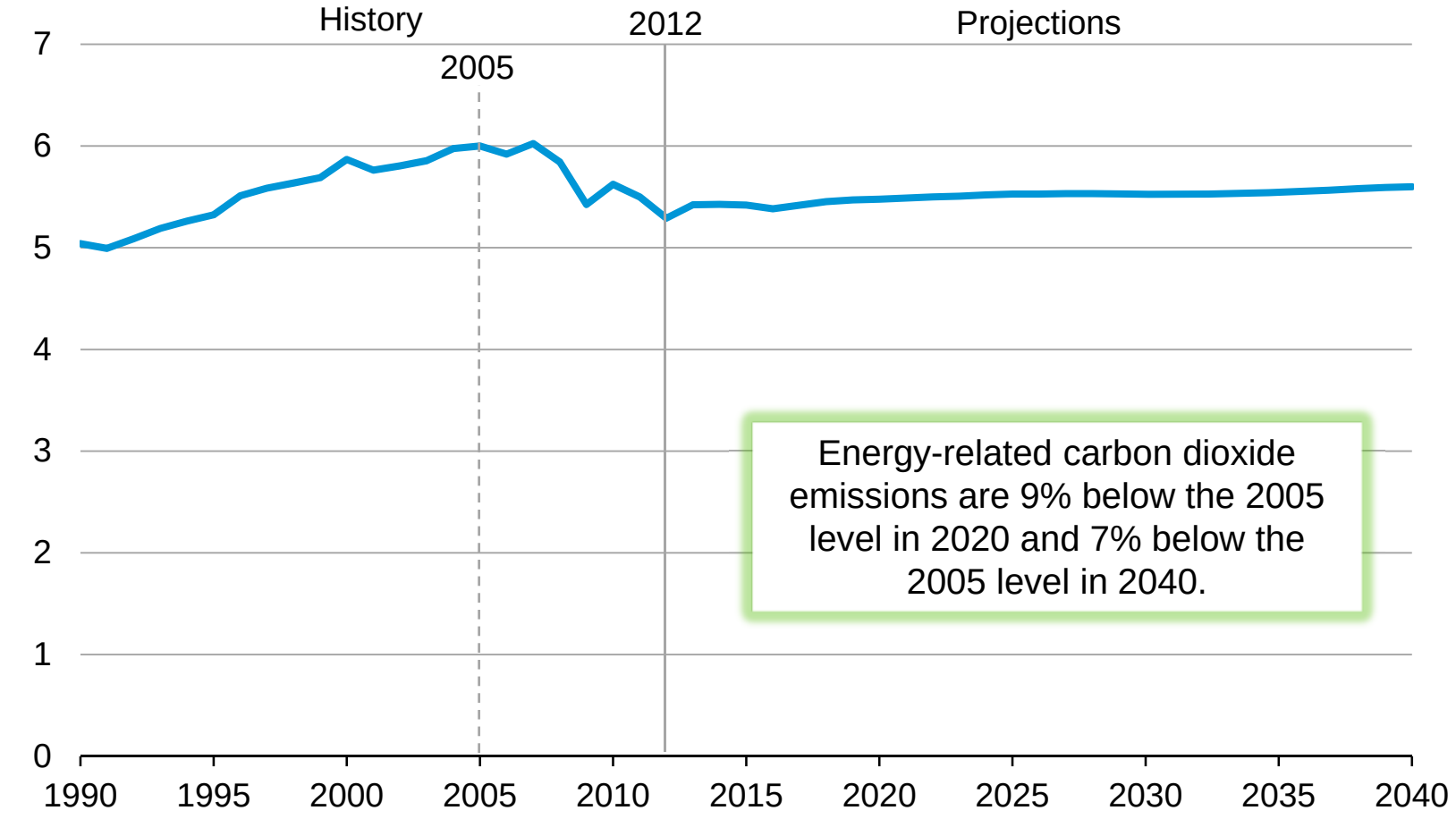


Source: EIA, Annual Energy Outlook 2014 Early Release

U.S. energy-related CO_2 emissions remain below the 2005 level throughout the projection period

carbon dioxide emissions

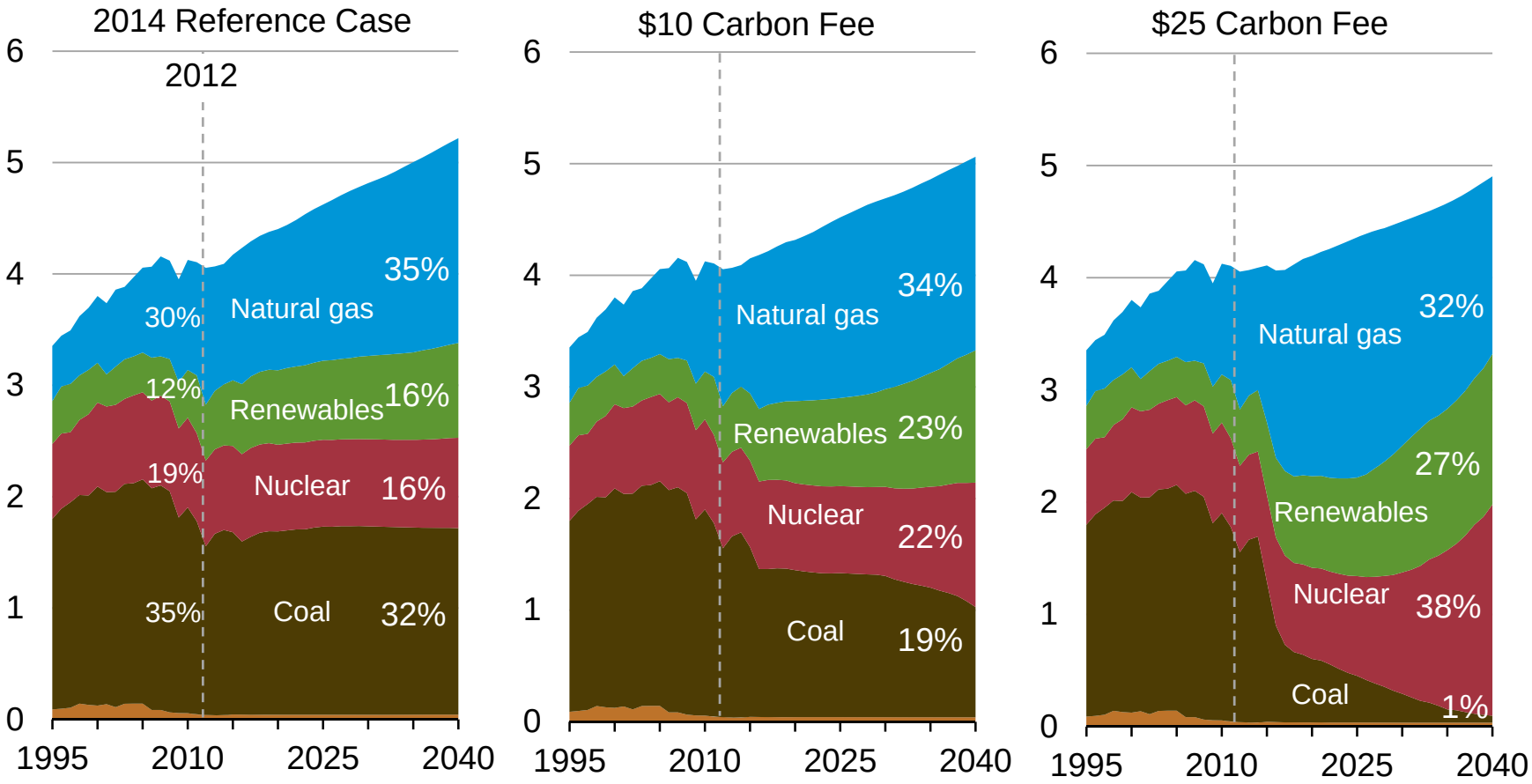
billion metric tons



Source: EIA, Annual Energy Outlook 2014 Early Release

An implicit or explicit carbon value growing at a 5% real rate has a huge impact on the projected generation mix in *AEO2014*

U.S. electricity net generation
trillion kilowatthours



Source: EIA, Annual Energy Outlook 2014 Early Release and Preliminary side cases