U.S. Energy Outlook

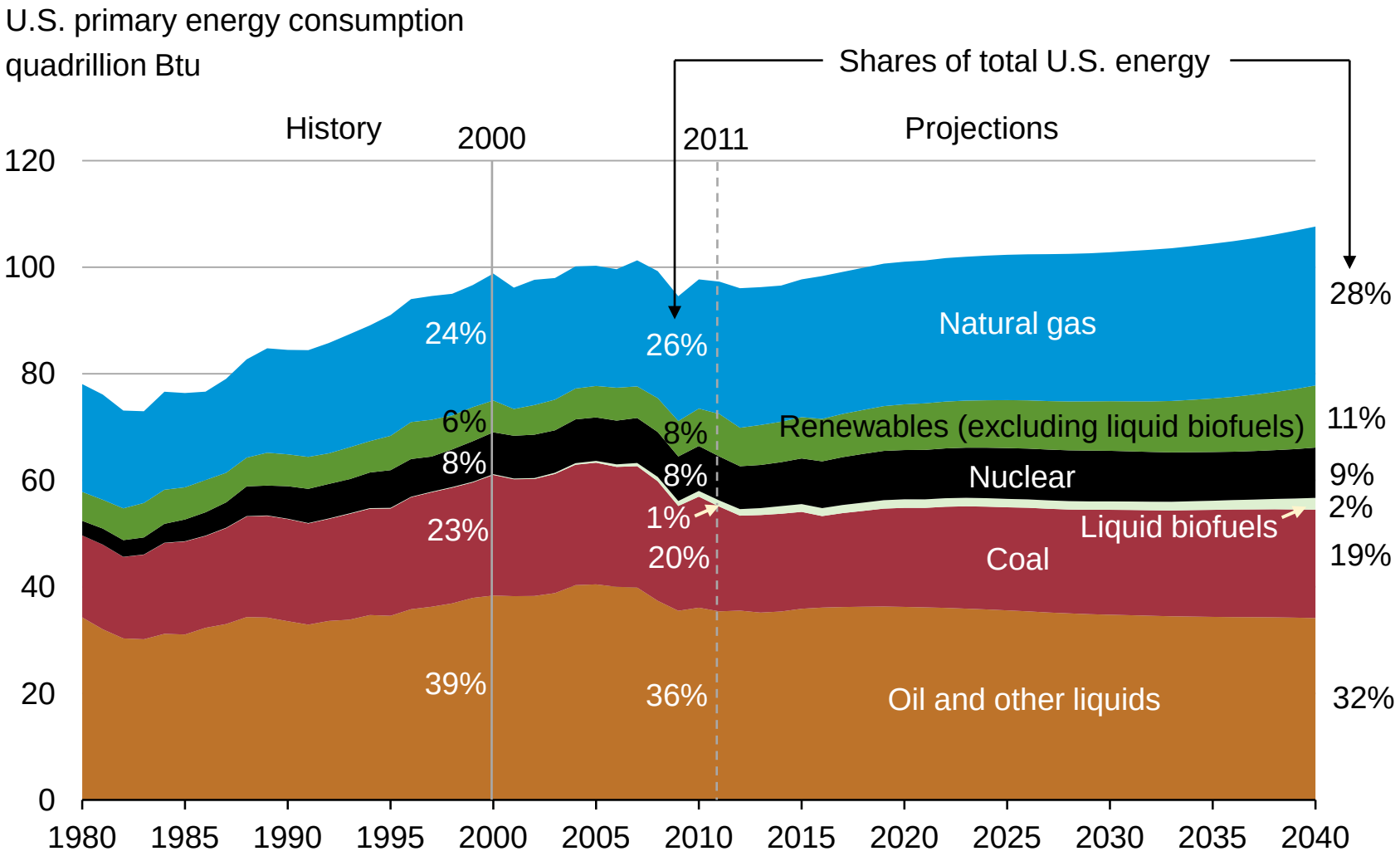
for
IEA Bilateral Meetings
March 14, 2013 | Paris, France

by
Adam Sieminski, Administrator

Annual Energy Outlook 2013 projections to 2040

- Growth in energy production outstrips consumption growth
- Crude oil production rises sharply over the next decade
- Motor gasoline consumption reflects more stringent fuel economy standards
- The U.S. becomes a net exporter of natural gas in the early 2020s
- U.S. energy-related carbon dioxide emissions remain below their 2005 level through 2040

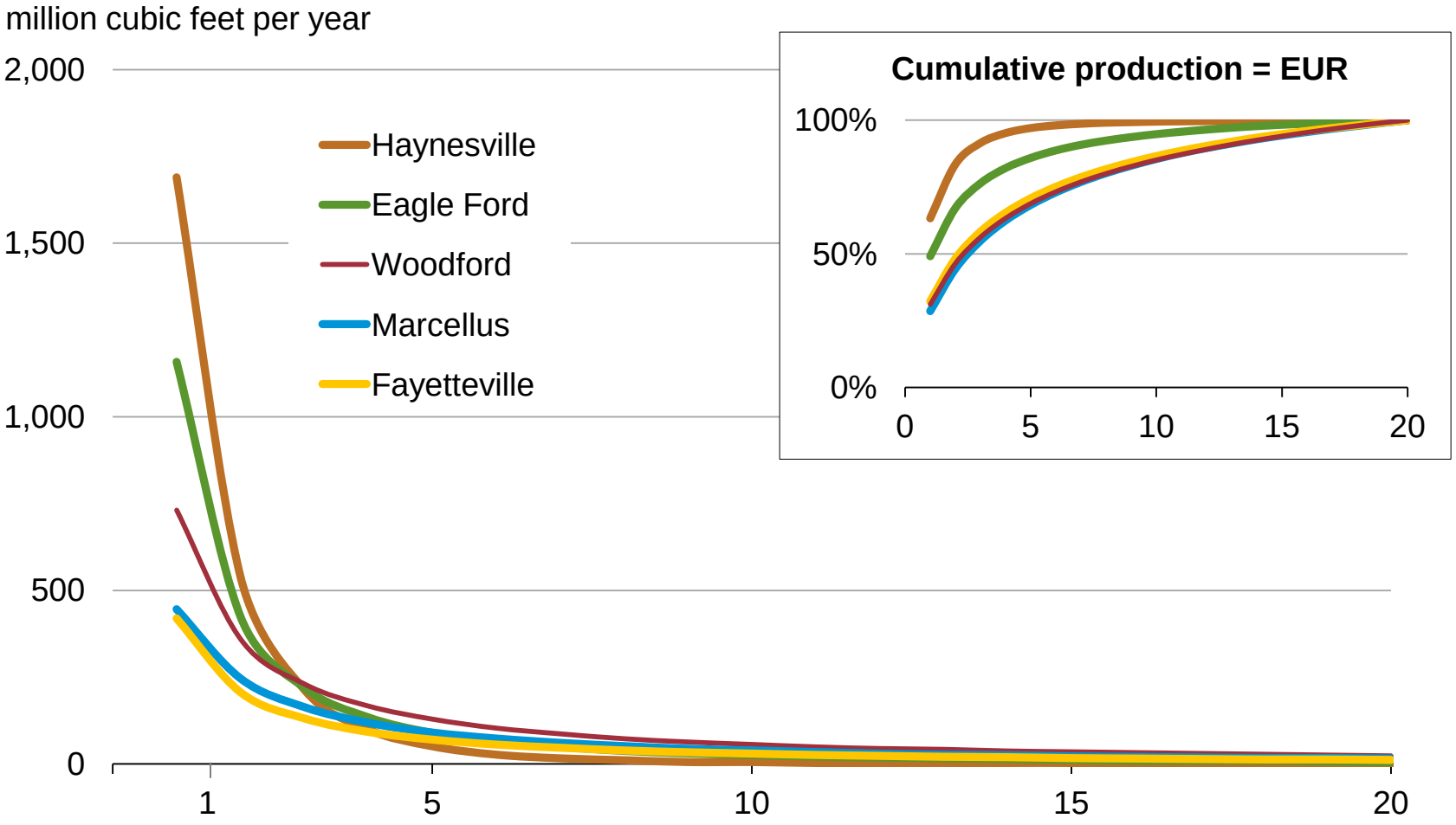
U.S. energy use grows slowly over the projection reflecting improving energy efficiency and slow, extended economic recovery



Source: EIA, Annual Energy Outlook 2013 Early Release

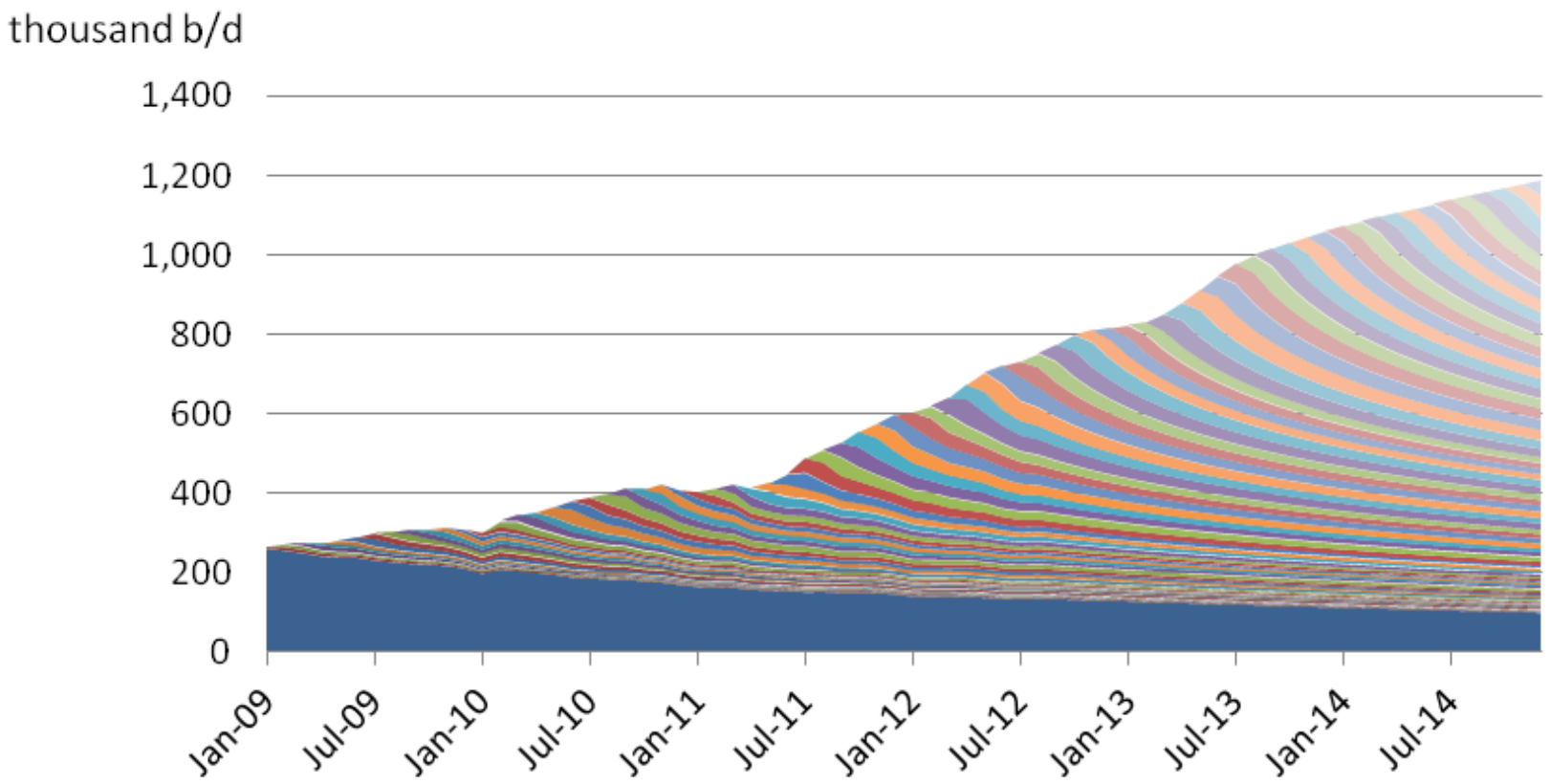
U.S. Shale Gas

An average well in shale gas and other continuous resource plays can also have steep decline curves, which require continued drilling to grow production



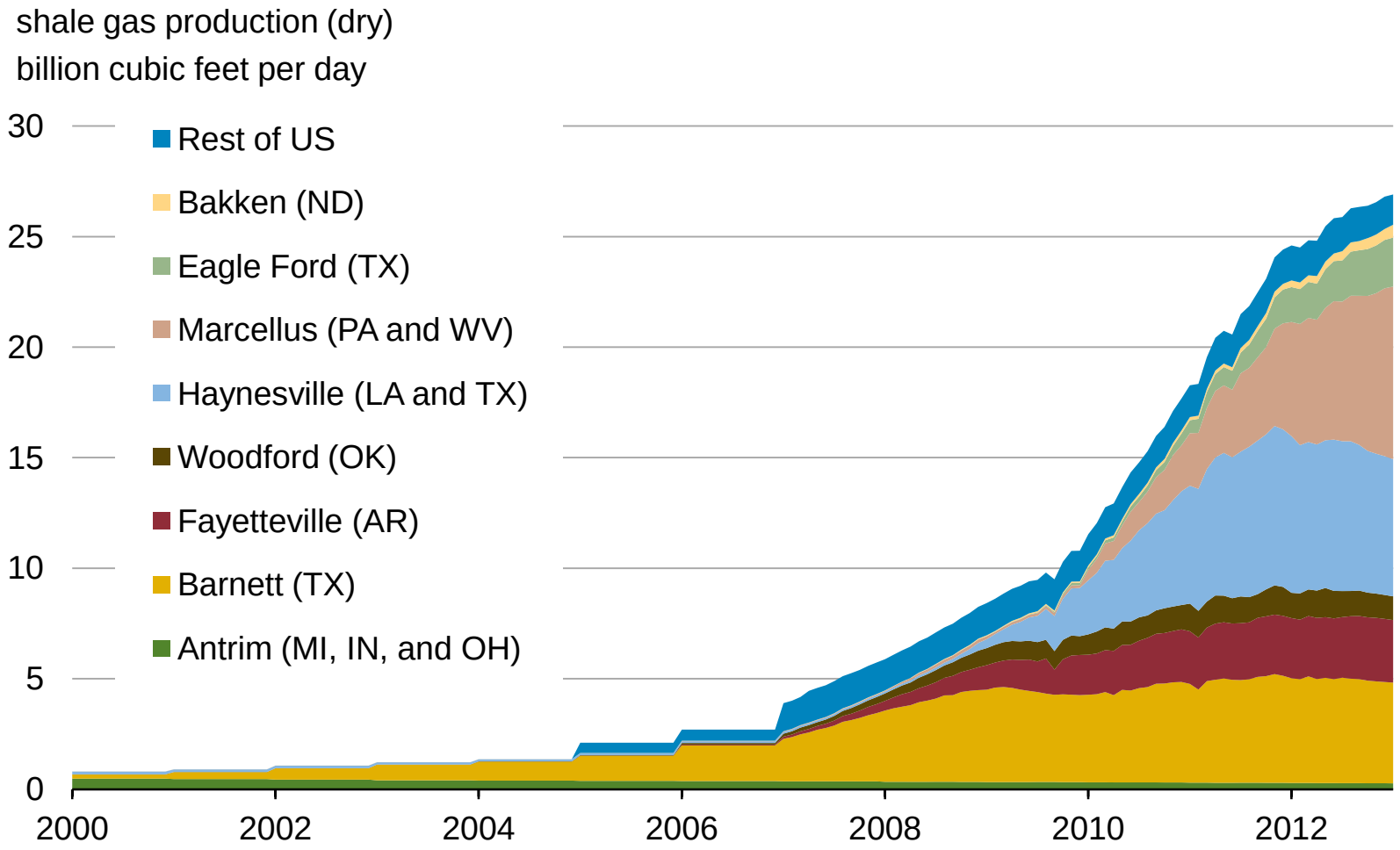
Source: EIA, Annual Energy Outlook 2012

For example: Oil production by monthly vintage of wells in the Williston Basin



Source: DrillingInfo history through August 2012, EIA Short-Term Energy Outlook, February 2013 forecast

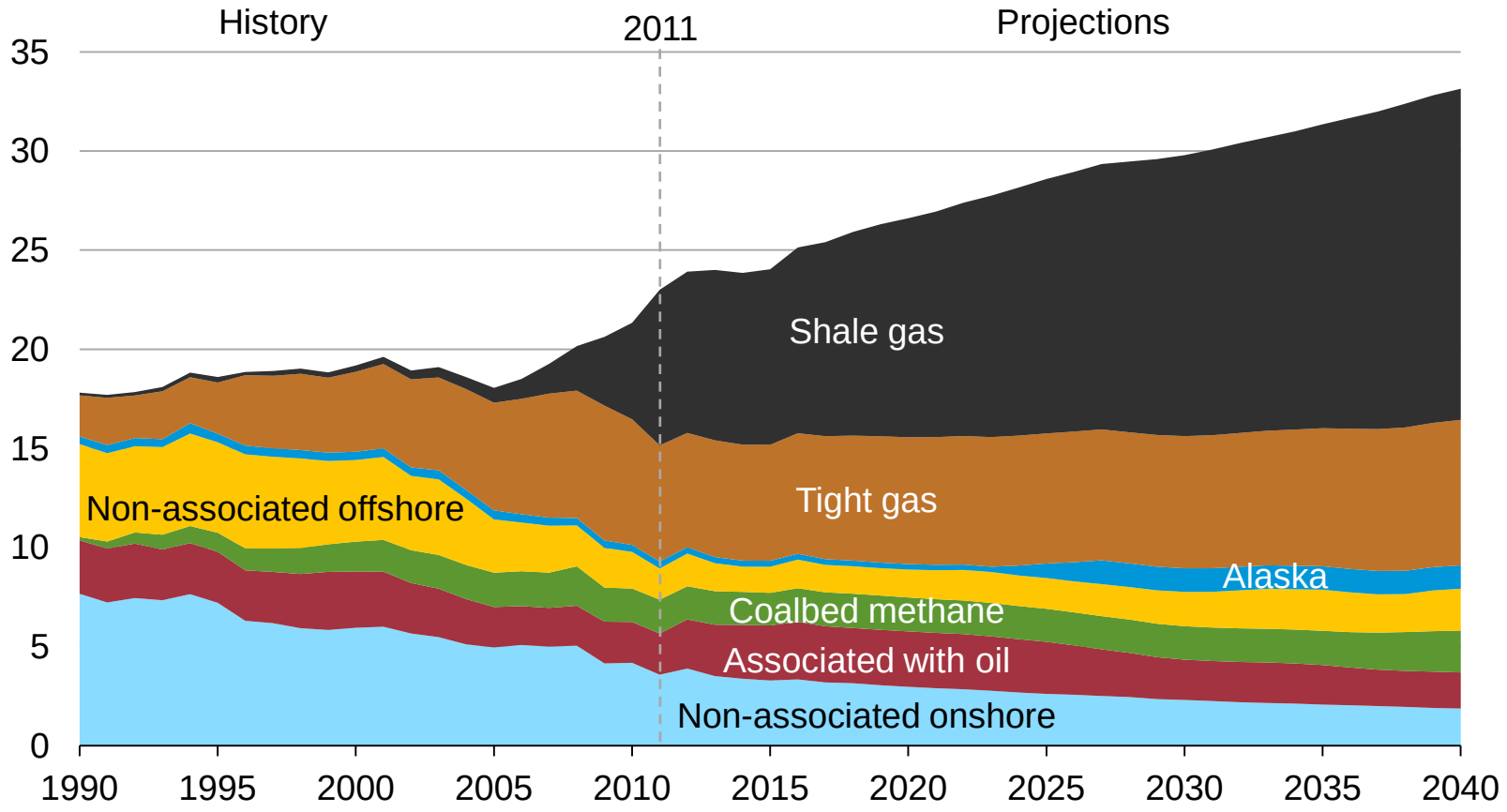
Domestic production of shale gas has grown dramatically over the past few years



Sources: LCI Energy Insight gross withdrawal estimates as of January 2013 and converted to dry production estimates with EIA-calculated average gross-to-dry shrinkage factors by state and/or shale play.

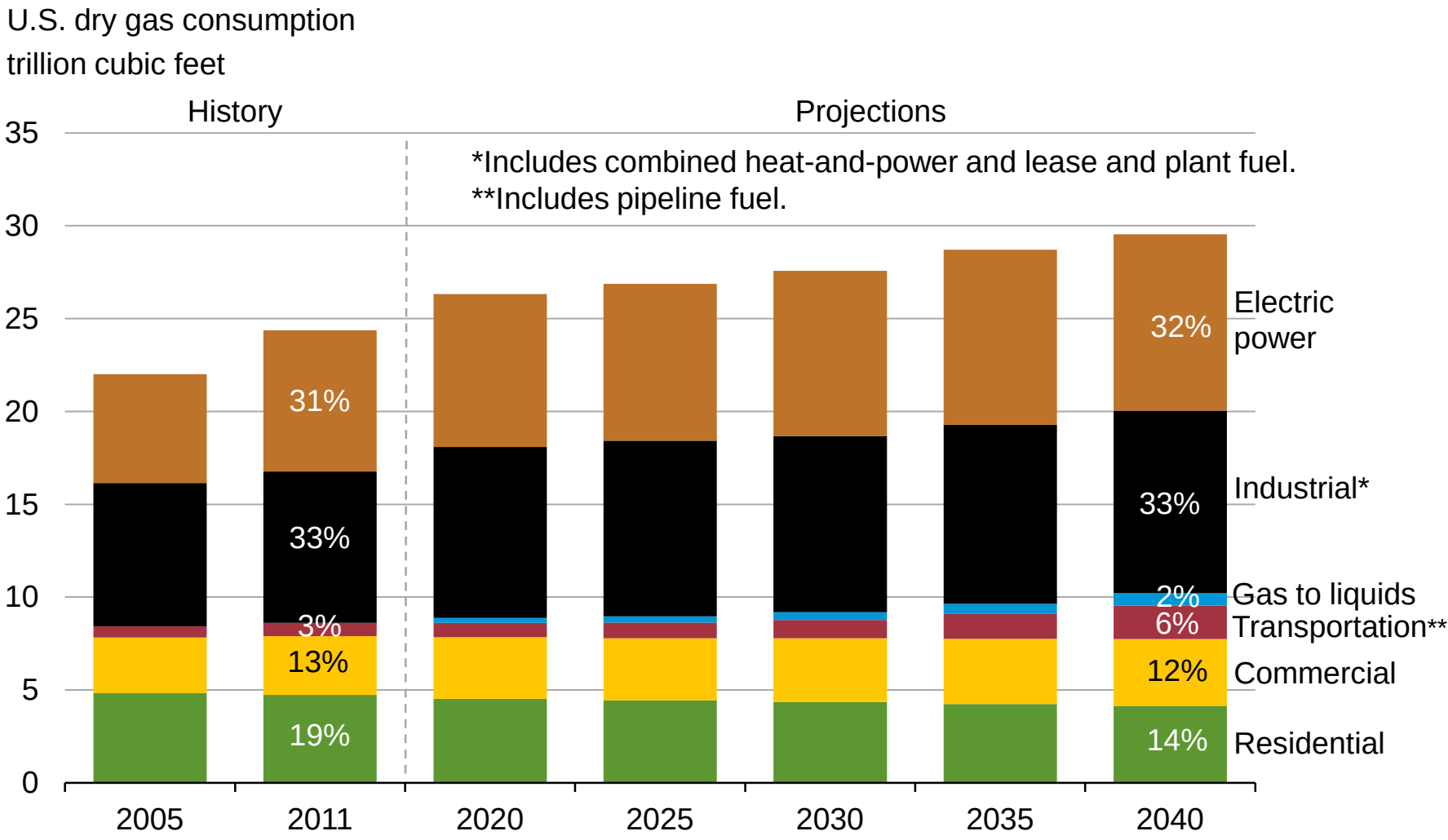
Shale gas leads growth in total gas production through 2040

U.S. dry natural gas production
trillion cubic feet



Source: EIA, Annual Energy Outlook 2013 Early Release

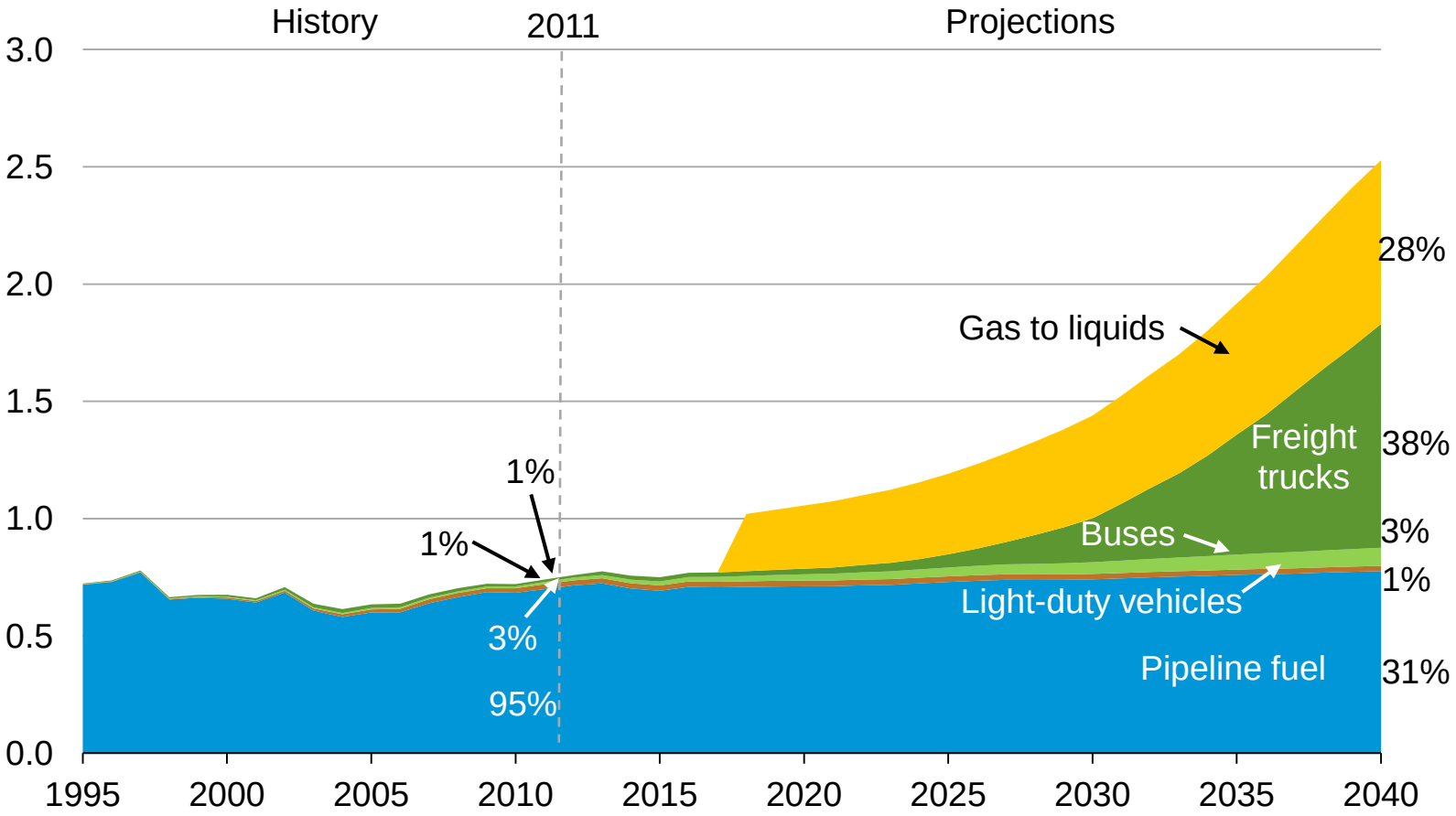
Natural gas consumption is quite dispersed with electric power, industrial, and transportation use driving future demand growth



Source: EIA, Annual Energy Outlook 2013 Early Release

Growth of natural gas in transportation led by heavy duty trucks (LNG) and gas to liquids (diesel)… marine and rail to come?

U.S. natural gas consumption
quadrillion Btu

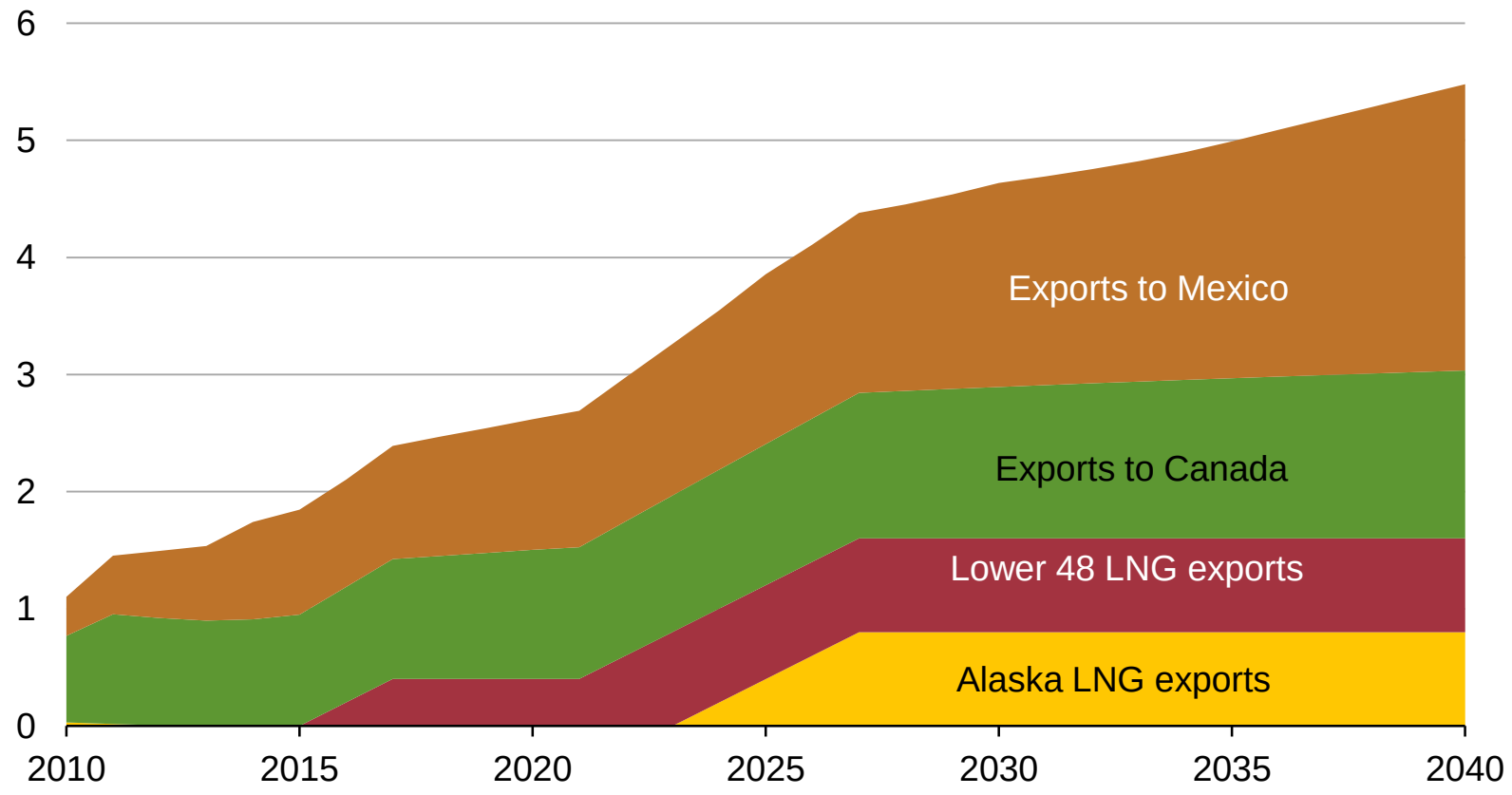


Note: Gas to liquids includes heat, power, and losses.

Source: EIA, Annual Energy Outlook 2013 Early Release

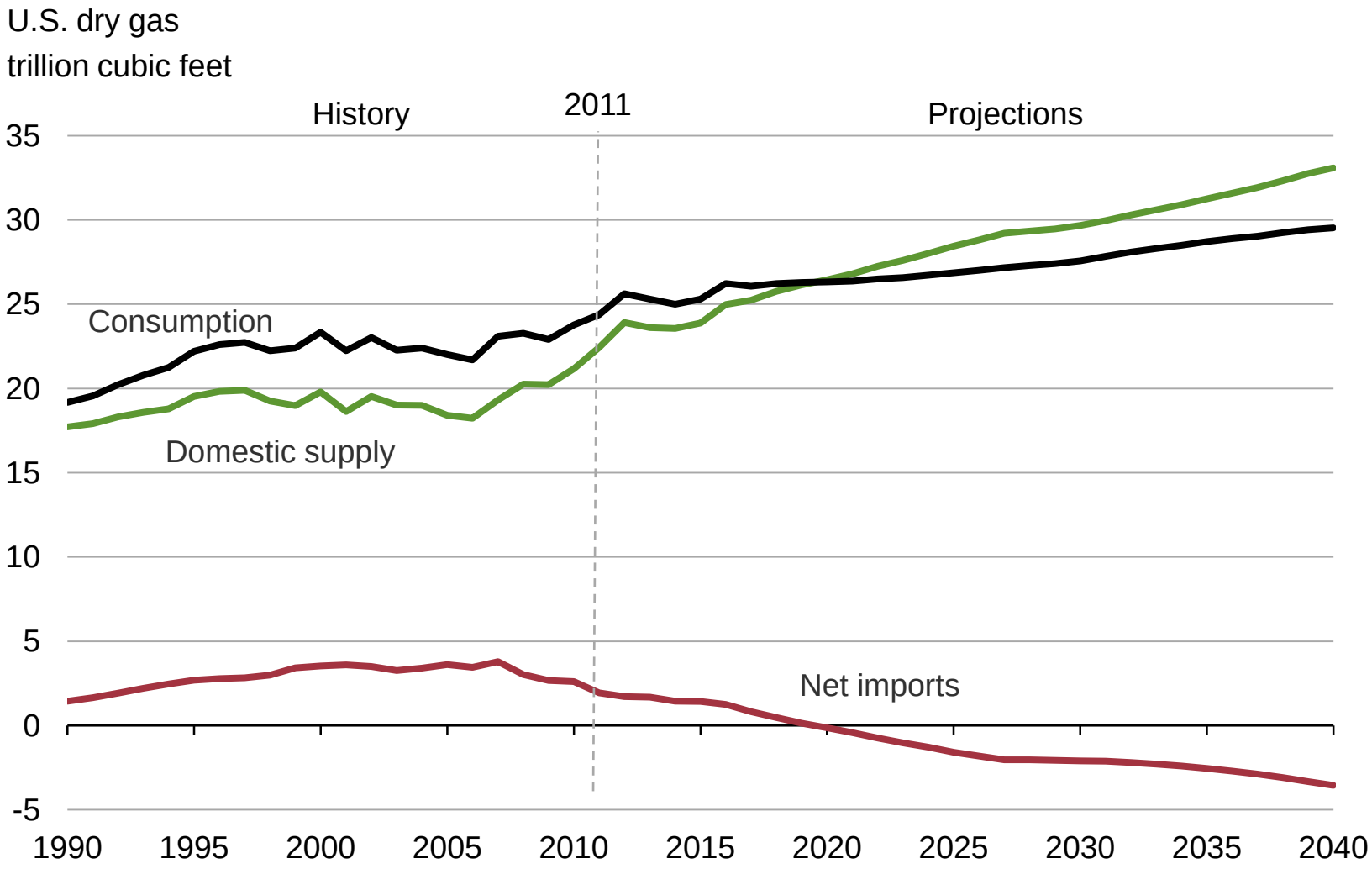
Total natural gas exports nearly quadruple by 2040 in the *AEO2013* Reference case

U.S. natural gas exports
trillion cubic feet



Source: EIA, Annual Energy Outlook 2013 Early Release

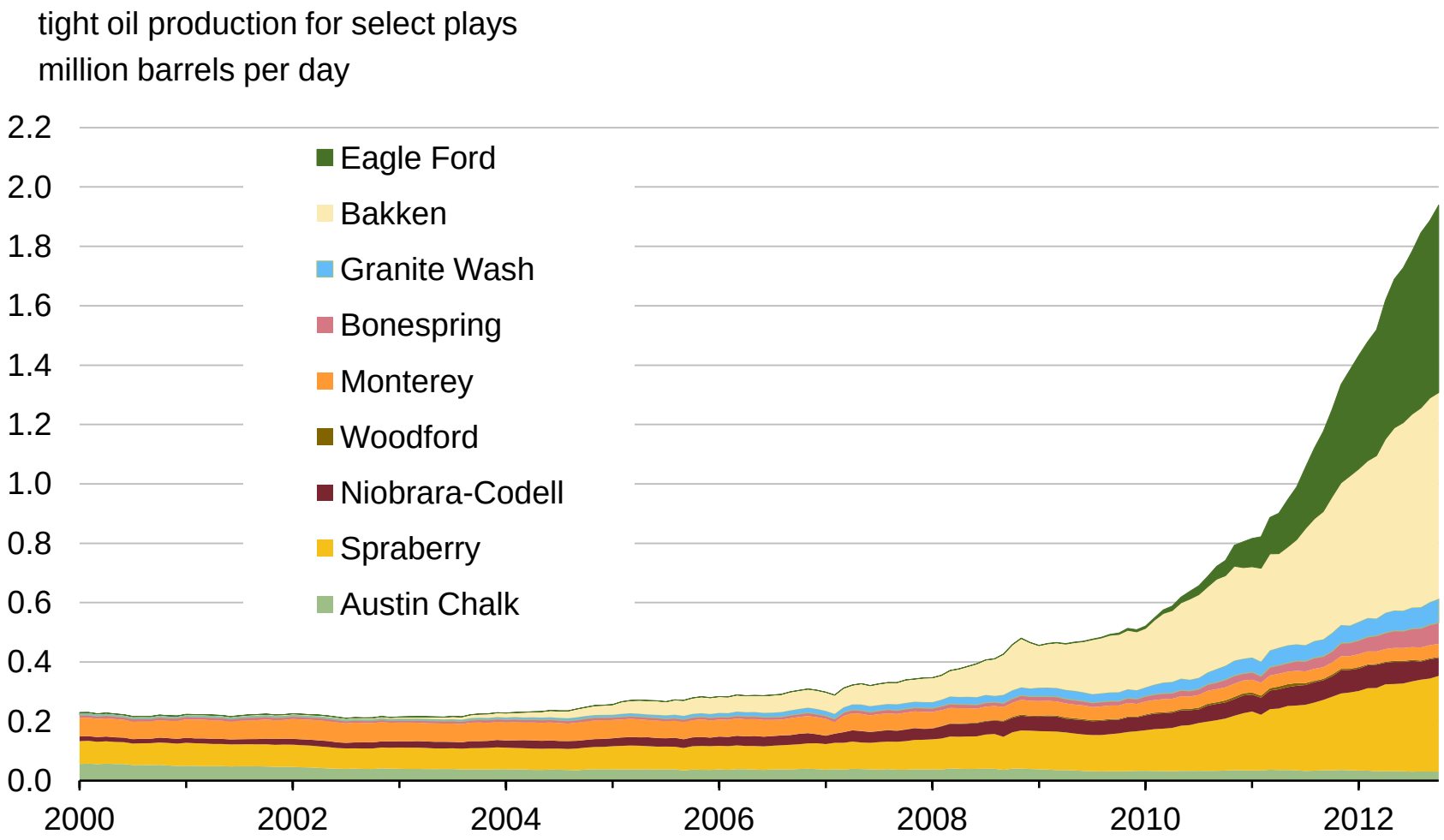
Domestic natural gas production grows faster than consumption and the U.S. becomes a net exporter of natural gas around 2020



Source: EIA, Annual Energy Outlook 2013 Early Release

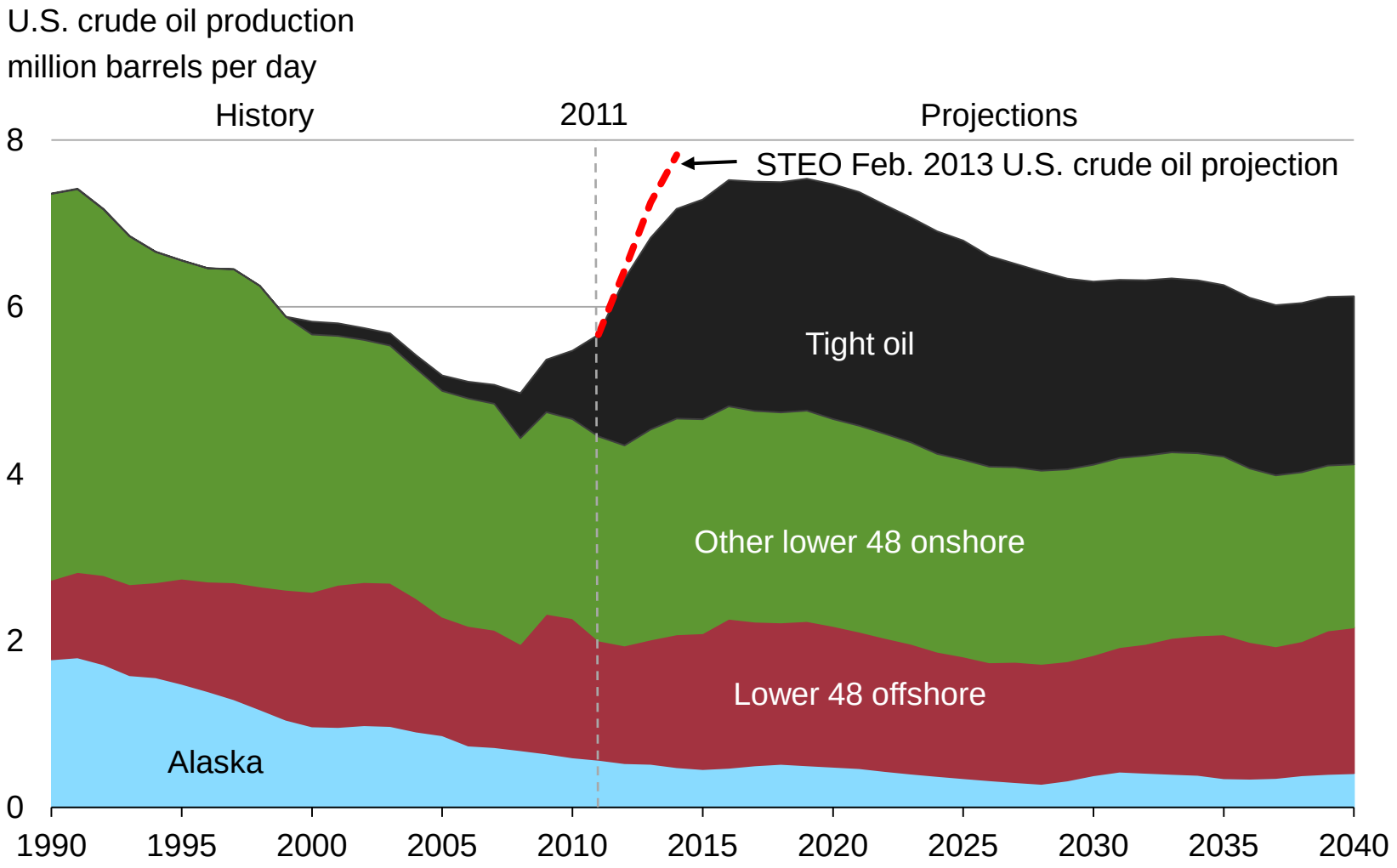
U.S. Tight Oil

Domestic production of tight oil has grown dramatically over the past few years



Source: Drilling Info (formerly HPDI), Texas RRC, North Dakota department of mineral resources, and EIA, through October 2012.

U.S. tight oil production leads a growth in domestic production of 2.6 million barrels per day between 2008 and 2019

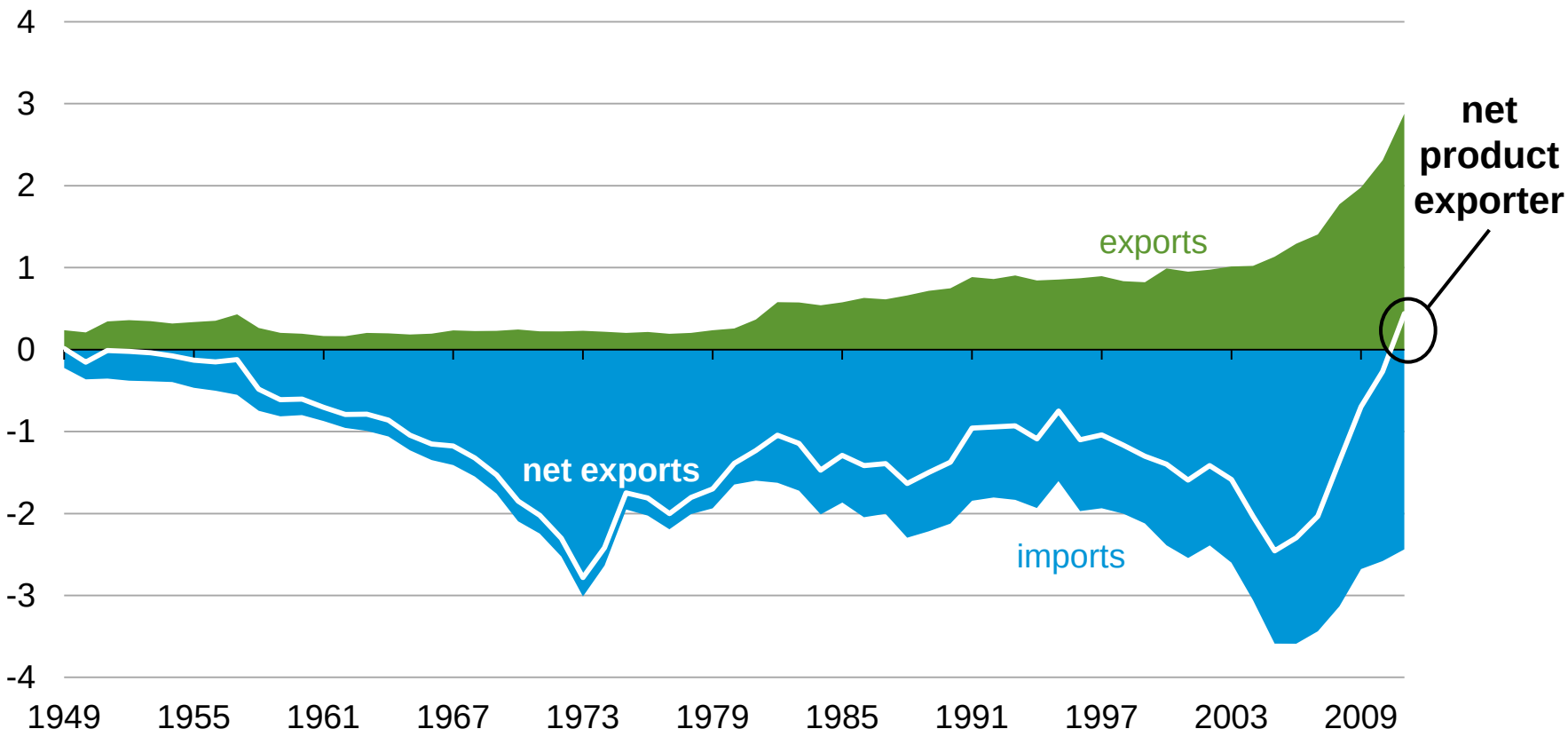


Source: EIA, Annual Energy Outlook 2013 Early Release and Short-Term Energy Outlook, February 2013

U.S. petroleum product exports exceeded imports in 2011 for first time in over six decades

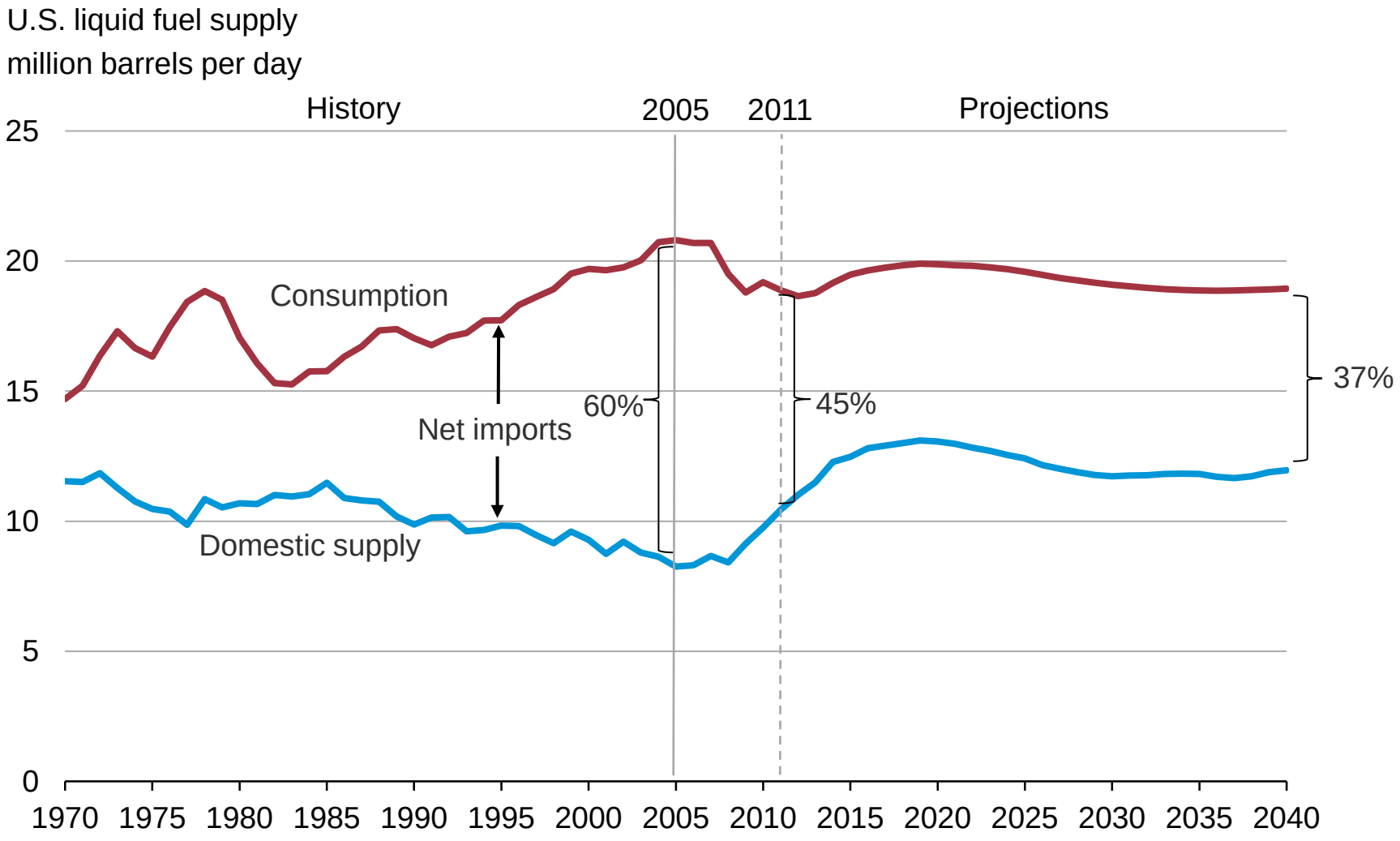
annual U.S. net exports of total petroleum products, 1949 – 2011

million barrels per day



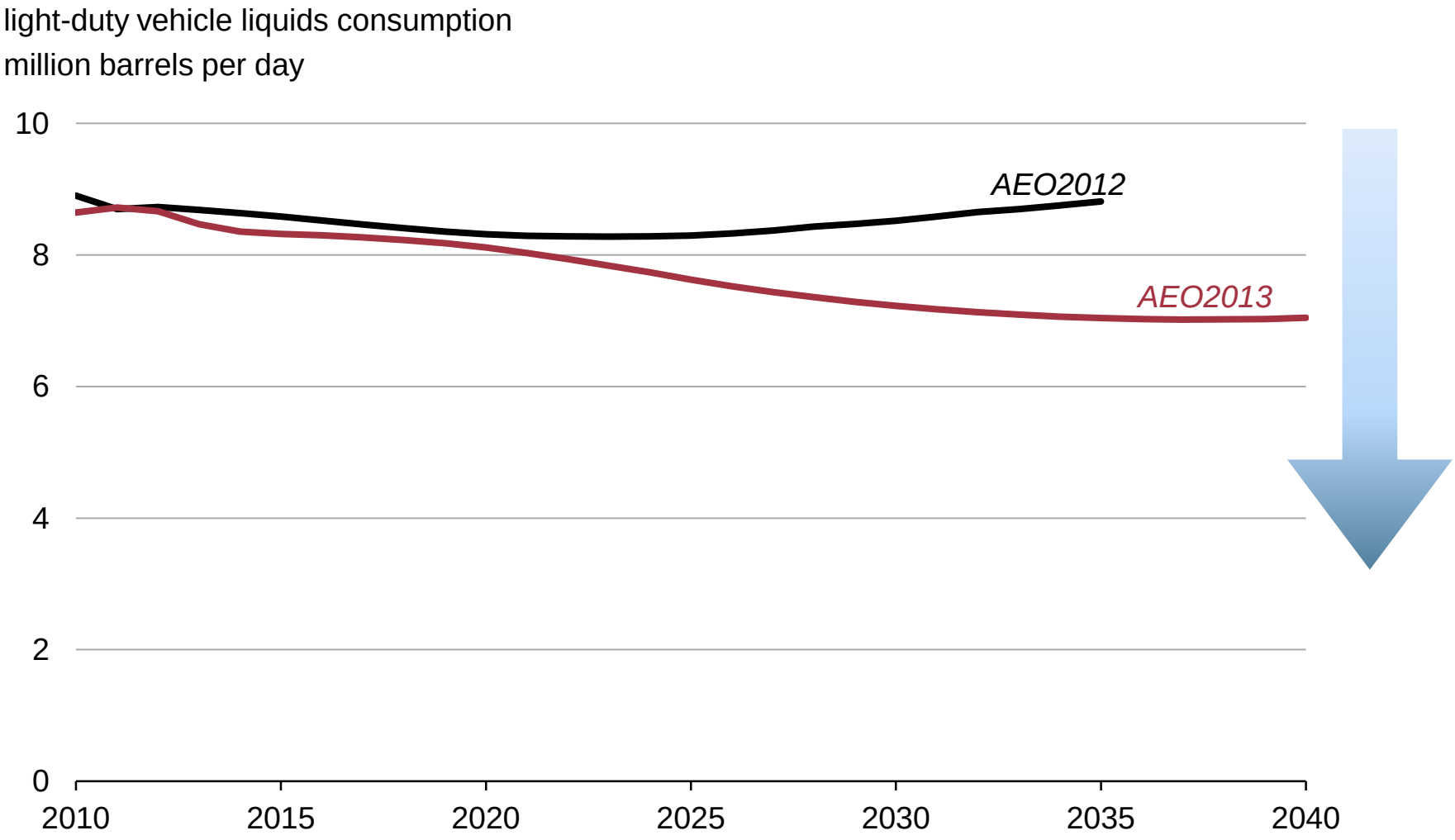
Source: EIA, Petroleum Supply Monthly

U.S. dependence on imported liquids depends on both supply and demand



Source: EIA, Annual Energy Outlook 2013 Early Release

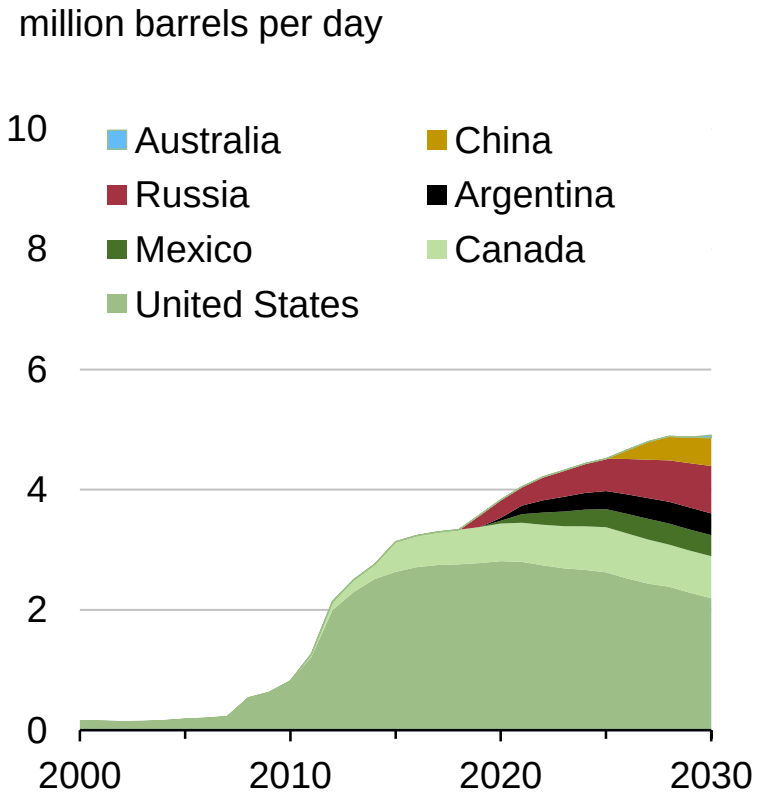
Light-duty vehicle liquids consumption is lower primarily due to more stringent CAFE standards



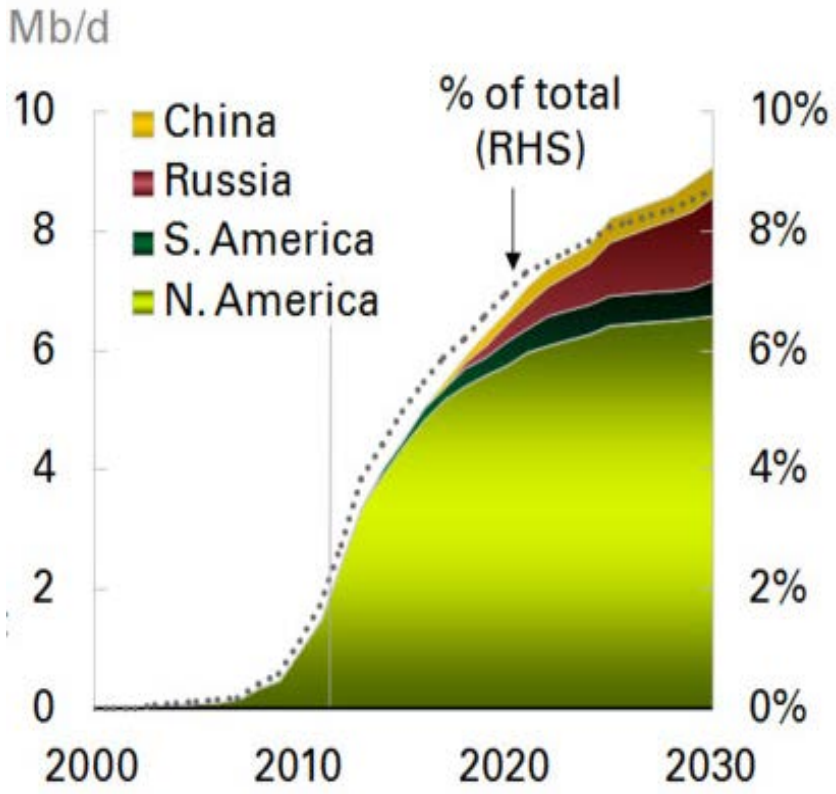
Source: EIA, Annual Energy Outlook 2013 Early Release

Global tight oil production comparisons

IEO2013 DRAFT



BP Energy Outlook 2030

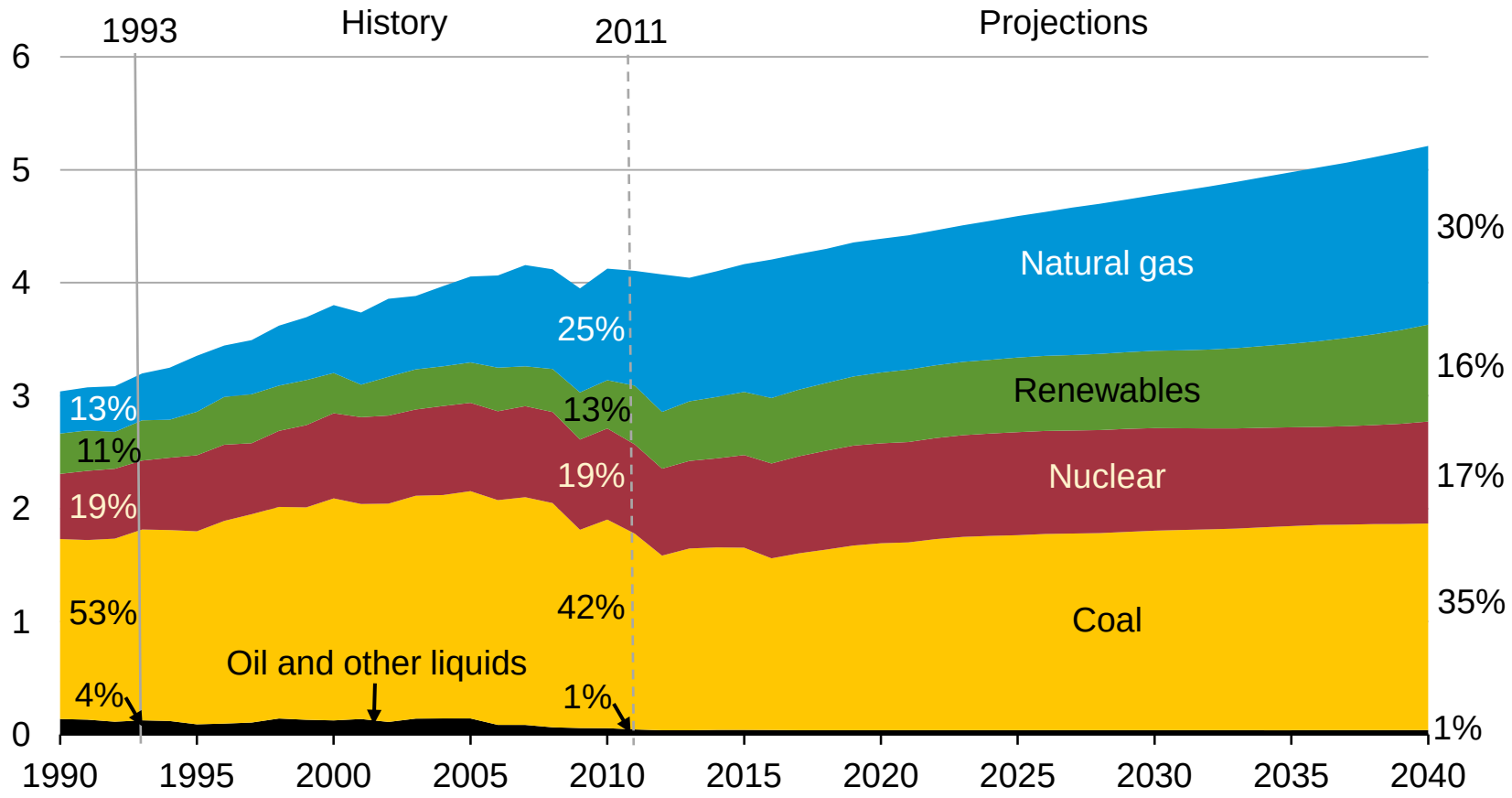


Source: Preliminary International Energy Outlook 2013, BP Energy Outlook 2030

U.S. Coal and Electricity

Over time the electricity mix shifts toward natural gas and renewables, but coal remains the largest fuel source

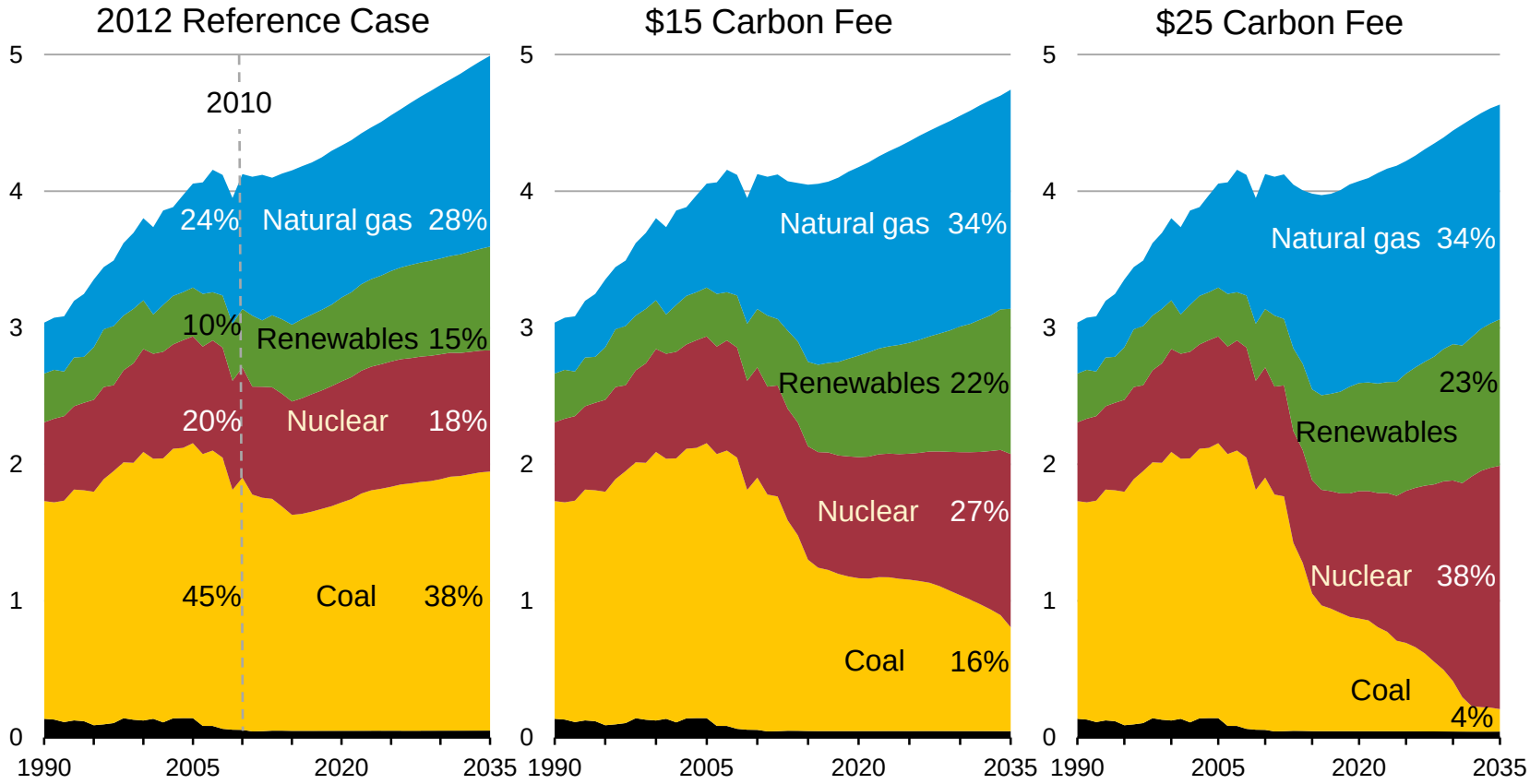
U.S. electricity net generation
trillion kilowatthours



Source: EIA, Annual Energy Outlook 2013 Early Release

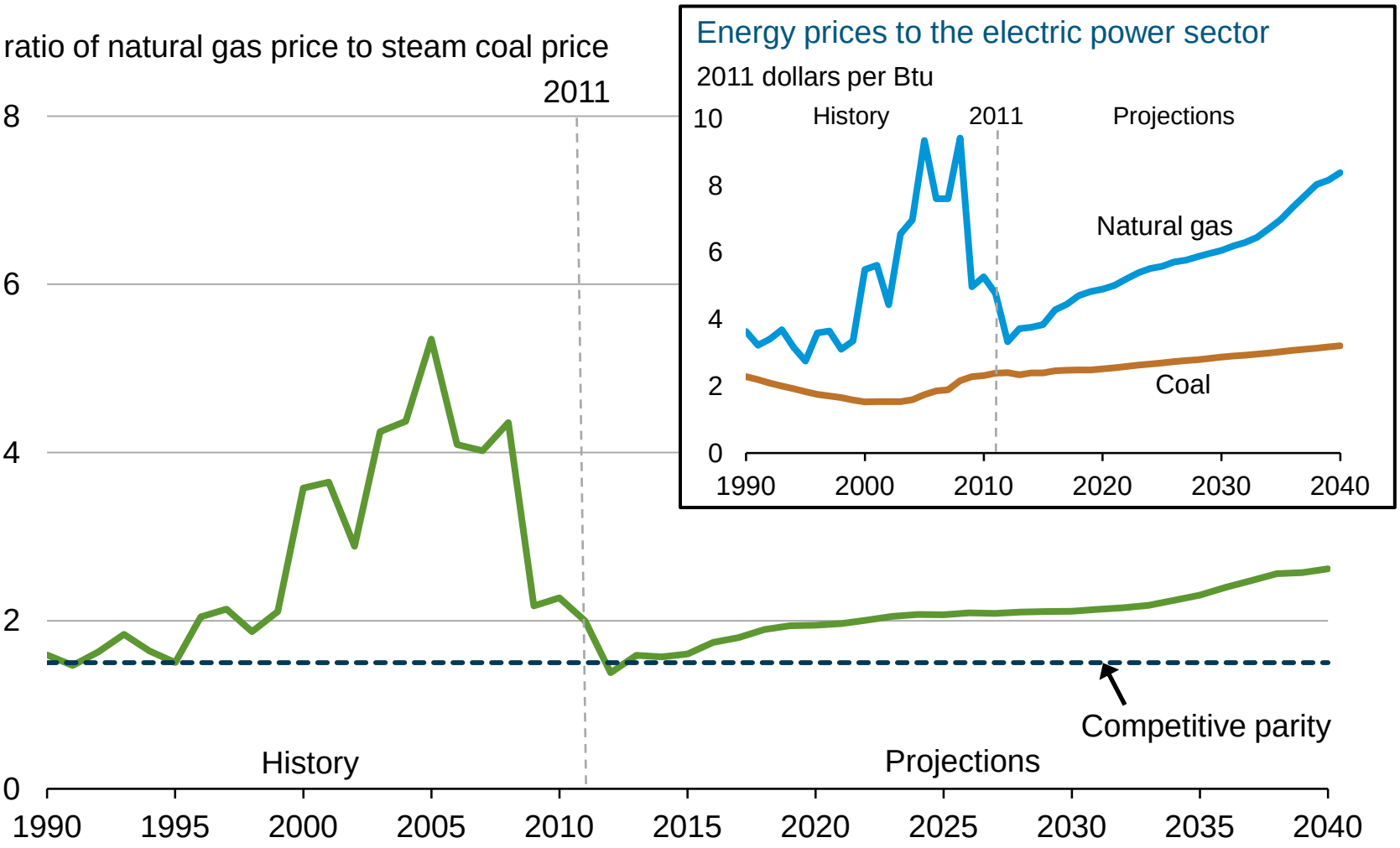
Changing electricity generation mix in *AEO2012* reference case and carbon fee allowance side cases

U.S. electricity net generation
trillion kilowatthours



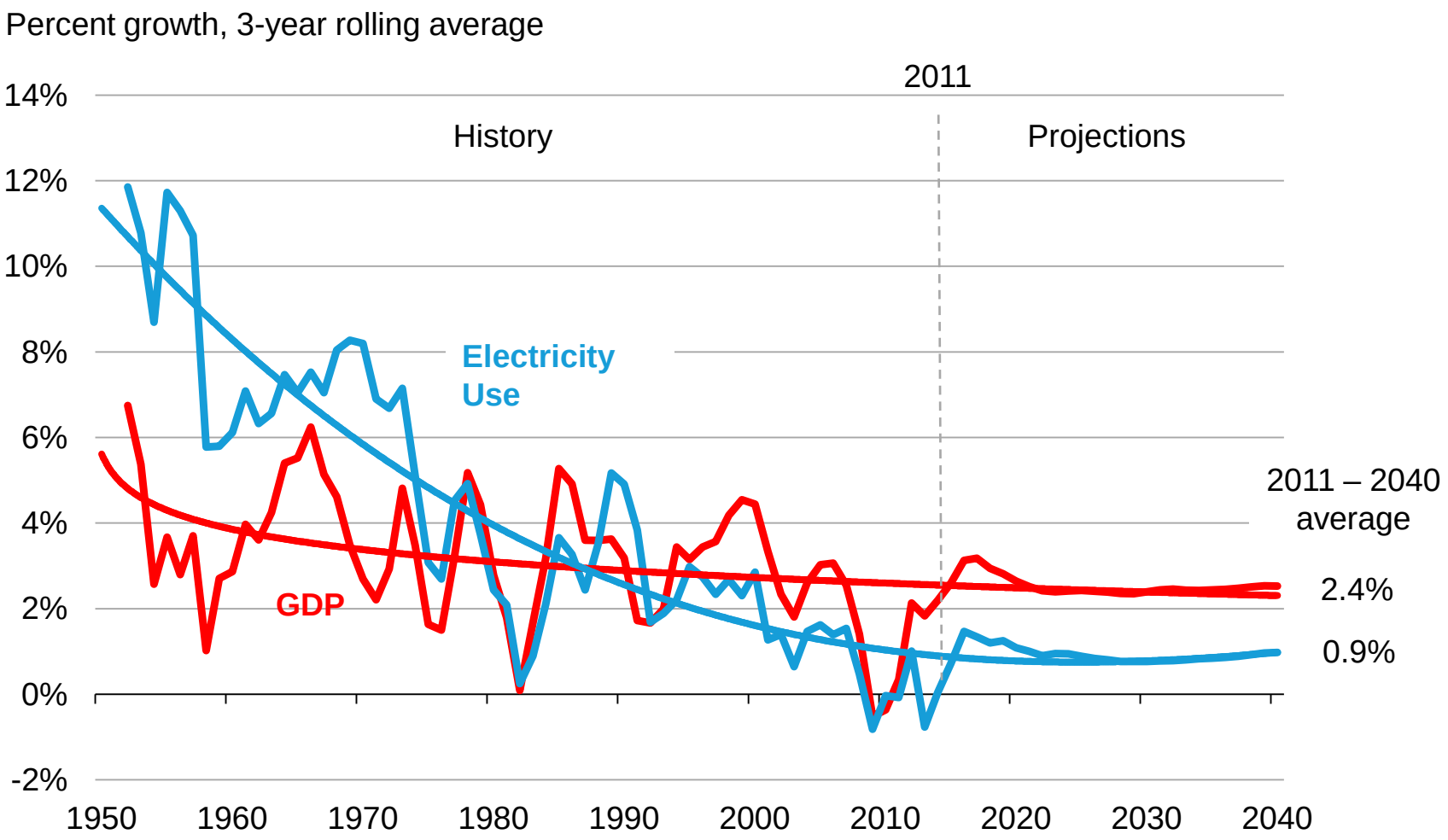
Source: EIA, Annual Energy Outlook 2012

Coal regains some competitive advantage relative to natural gas over time on a national average basis



Source: EIA, Annual Energy Outlook 2013 Early Release

U. S. electricity use and economic growth, 1950-2040

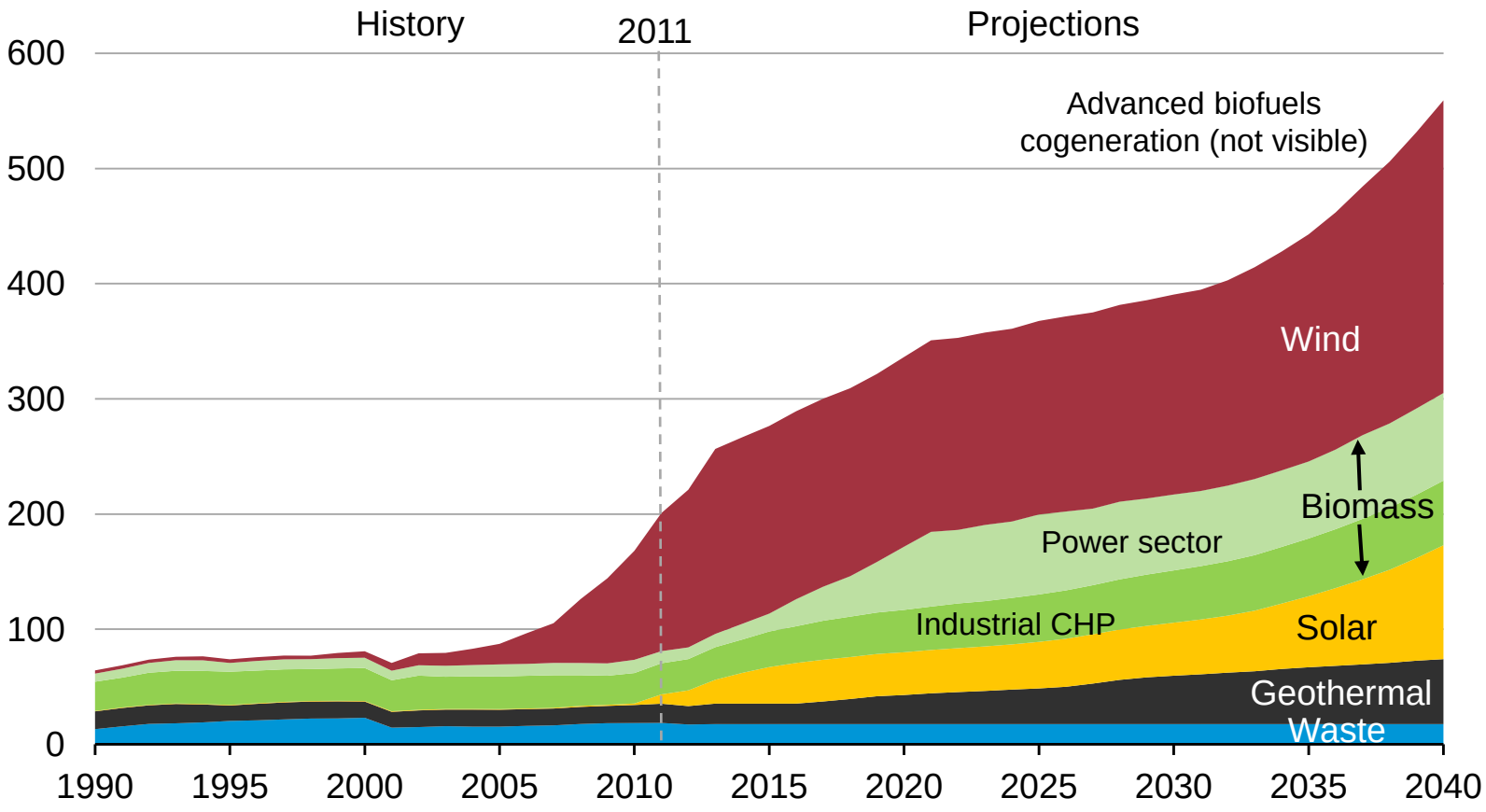


Source: EIA, Annual Energy Outlook 2013 Early Release

U.S. Renewables and Biofuels

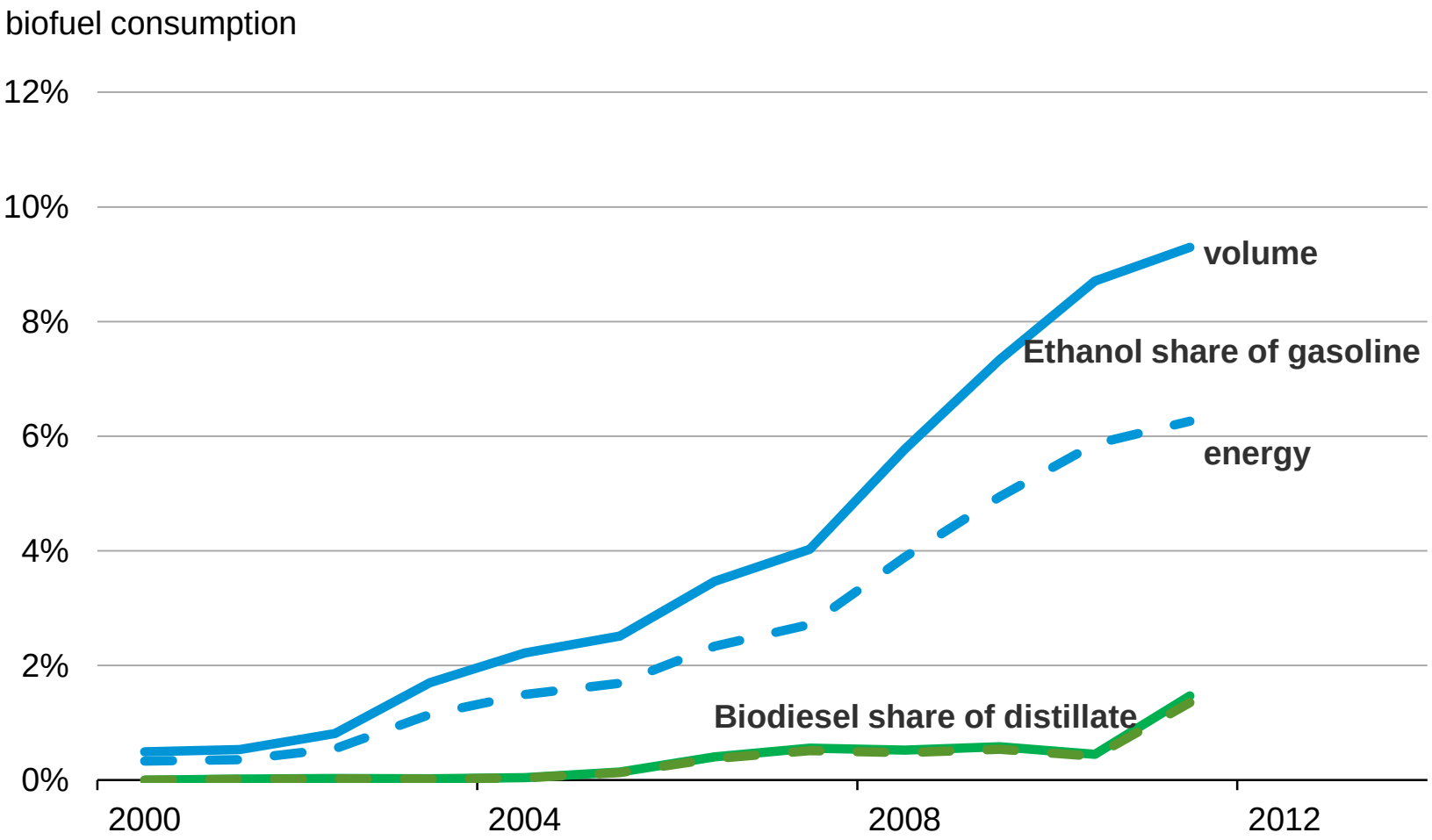
Non-hydro renewable generation more than doubles between 2011 and 2040

non-hydropower renewable generation
billion kilowatthours per year



Source: EIA, Annual Energy Outlook 2013 Early Release

Despite recent growth, ethanol and biodiesel provide a modest share of U.S. motor fuels

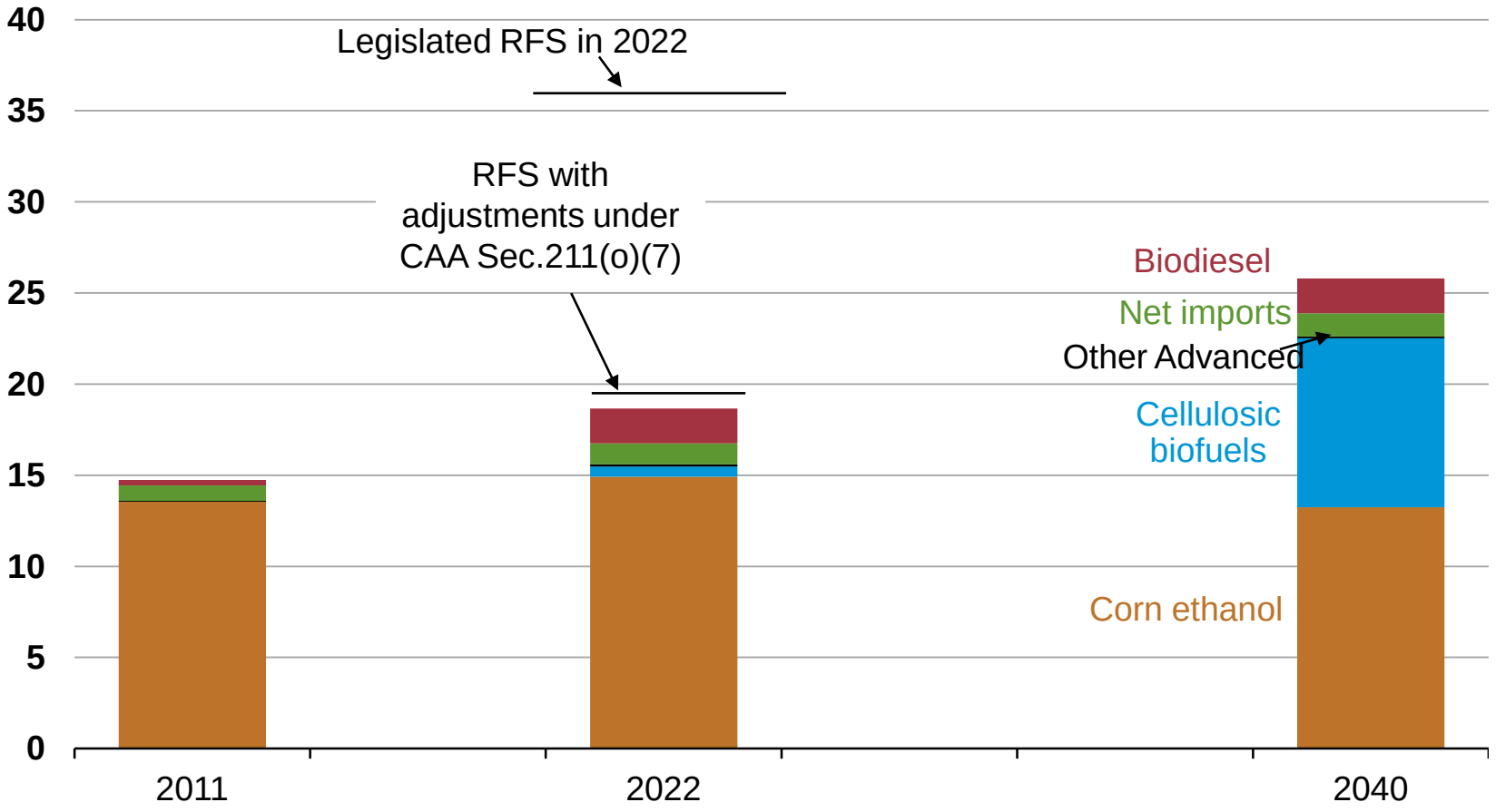


Source: EIA, Short-Term Energy Outlook, November 2012

Biofuels grow at a slow rate due to lower near-term crude oil prices and slow growth in sales of high-percentage ethanol blends such as E85

renewable fuel standard credits

billions ethanol-equivalent gallons

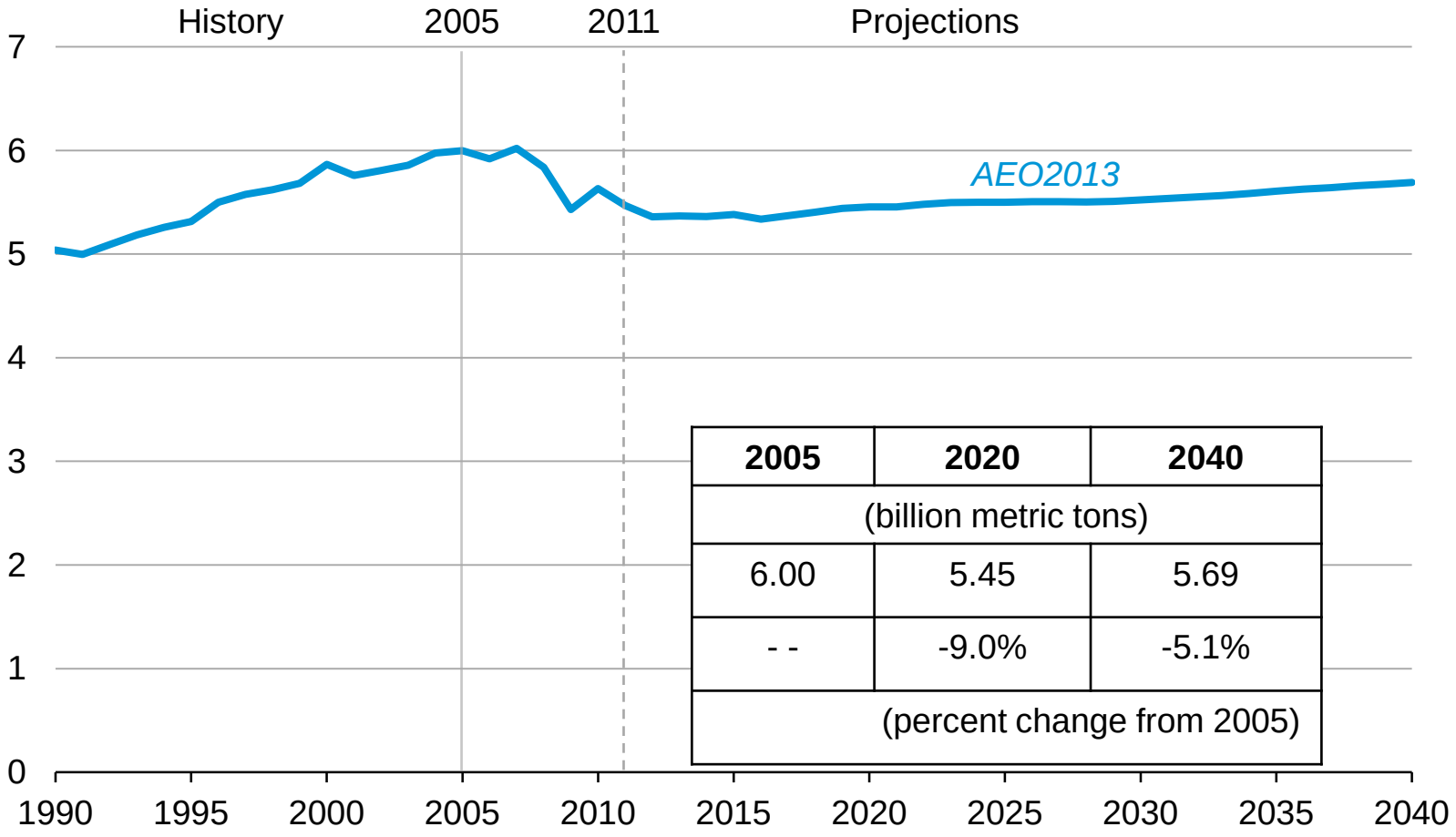


Sources: EIA, Annual Energy Outlook 2013 Early Release and EIA, Annual Energy Outlook 2012

In the *AEO2013* Reference case, energy-related CO_2 emissions never get back to their 2005 level

carbon dioxide emissions

billion metric tons



2005	2020	2040
(billion metric tons)		
6.00	5.45	5.69
- -	-9.0%	-5.1%
(percent change from 2005)		

Source: EIA, Annual Energy Outlook 2013 Early Release

For more information

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

Annual Energy Outlook | www.eia.gov/forecasts/aeo

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

International Energy Outlook | www.eia.gov/forecasts/ieo

Today In Energy | www.eia.gov/todayinenergy

Monthly Energy Review | www.eia.gov/totalenergy/data/monthly

Annual Energy Review | www.eia.gov/totalenergy/data/annual