Status and outlook for shale gas and tight oil development in the U.S.

For

Consumer Energy Alliance

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By

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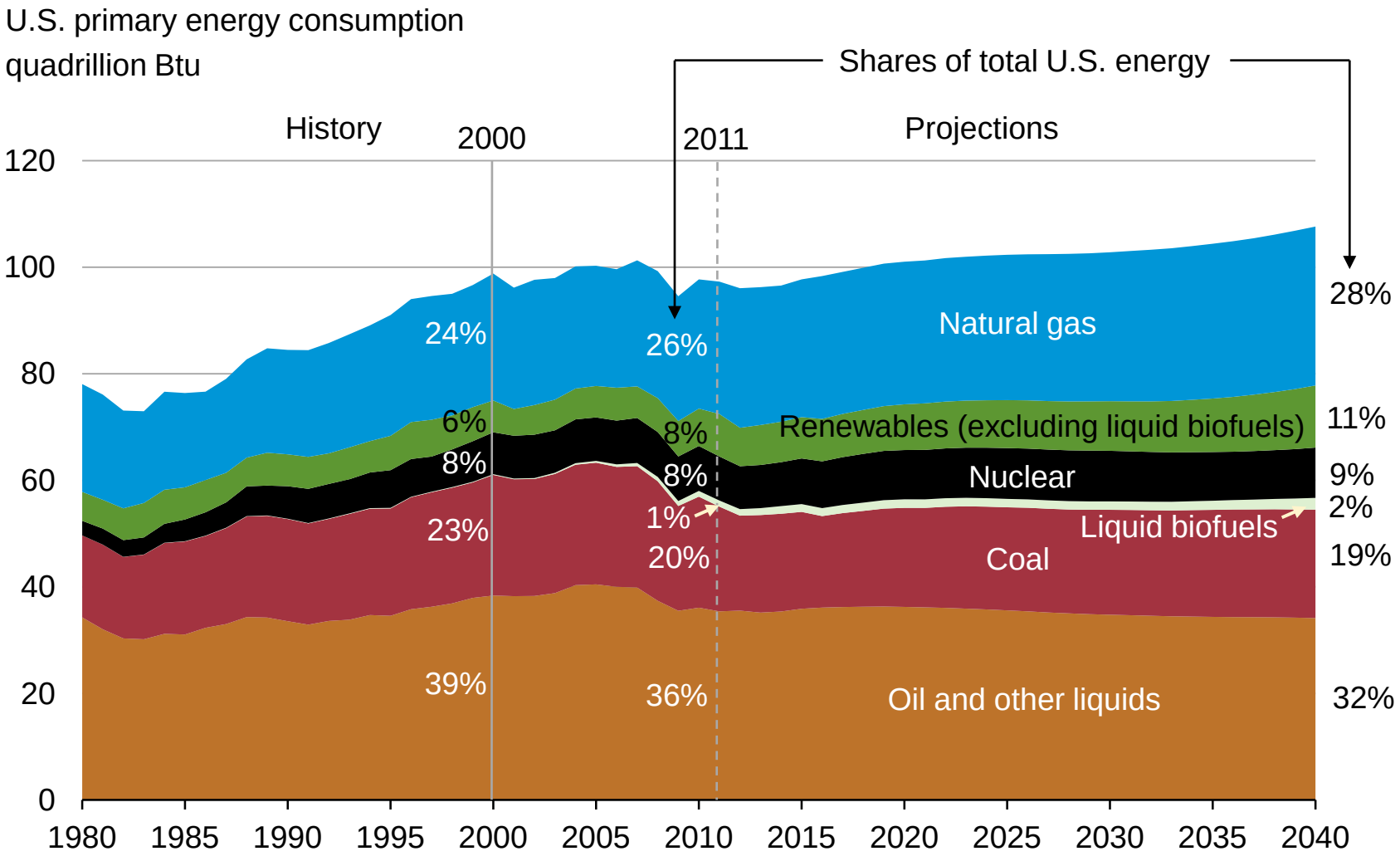
Annual Energy Outlook 2013 projections to 2040

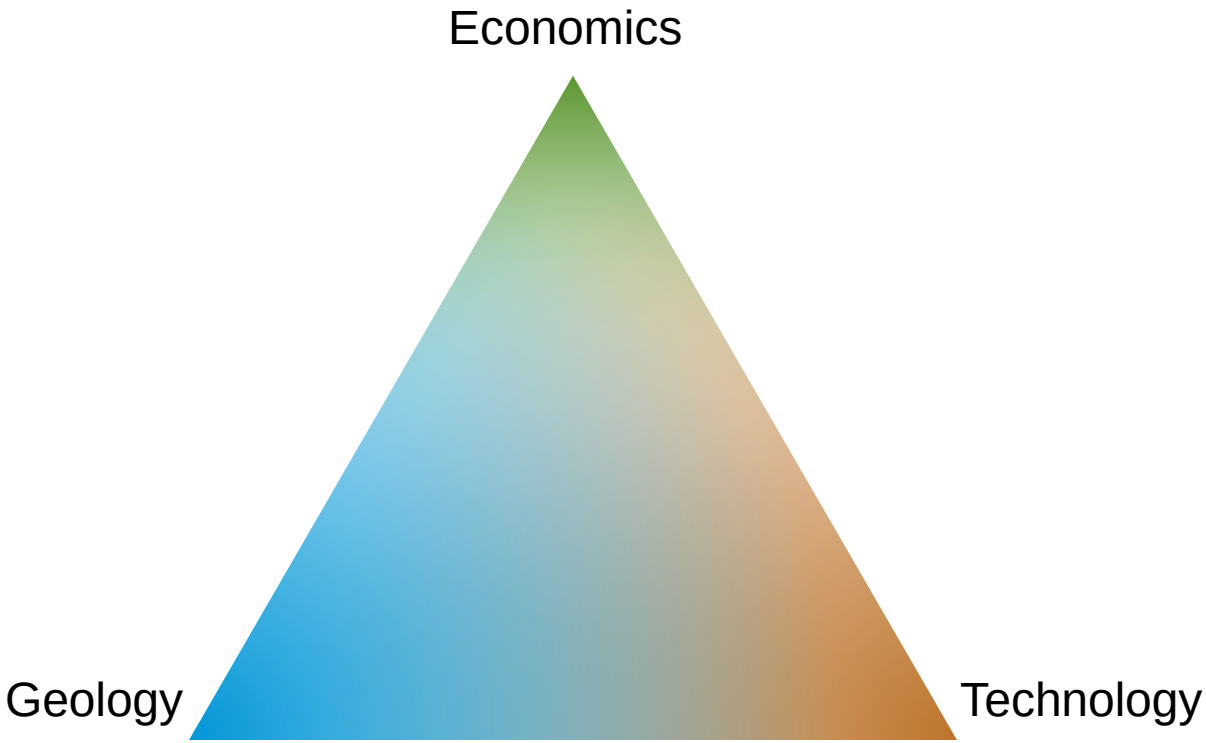
- Growth in energy production outstrips consumption growth
- Crude oil production rises sharply over the next decade
- Motor gasoline consumption reflects more stringent fuel economy standards
- The U.S. becomes a net exporter of natural gas in the early 2020s
- U.S. energy-related carbon dioxide emissions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

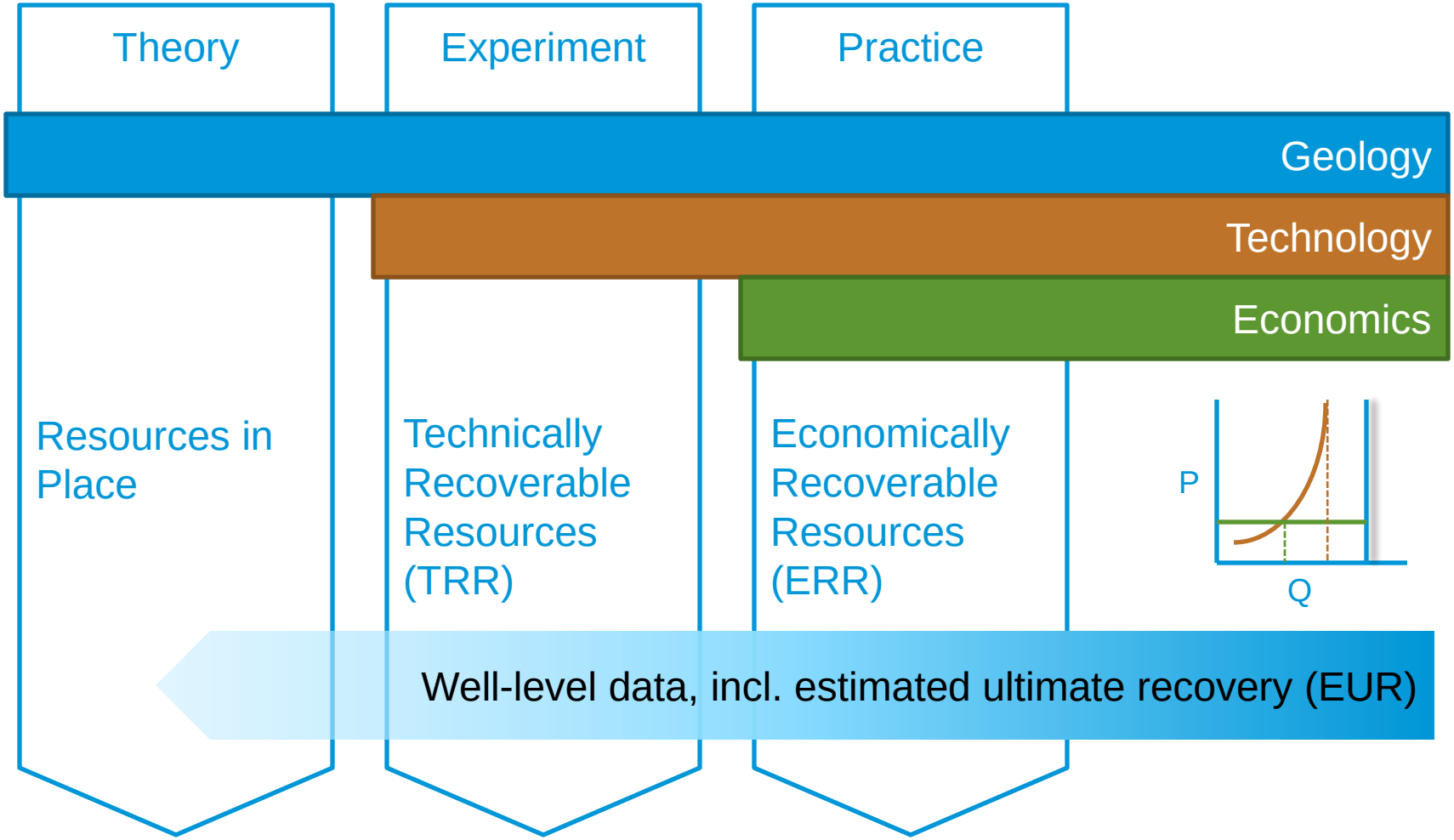


Source: EIA, Annual Energy Outlook 2013 Early Release

There are three main drivers of oil and natural gas production and resource estimates

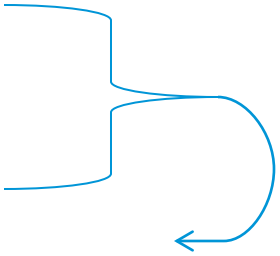


These three drivers impact resource estimation metrics differently over time in an iterative process



EIA's focus is on the timing of production; the modeling focuses on these parameters

- average initial production (IP) rate per well
- average decline curve (can vary by region and vintage)
- IP & decline curve define the Estimated Ultimate Recovery (EUR) per well



Other parameters

- drilling and operating costs
- number of active rigs
- how many wells a rig can drill (rig efficiency)
- well spacing

Technically recoverable resources (TRR) result from the well analysis

Area (acres)

÷ drainage area of a well

× % of area not yet drilled

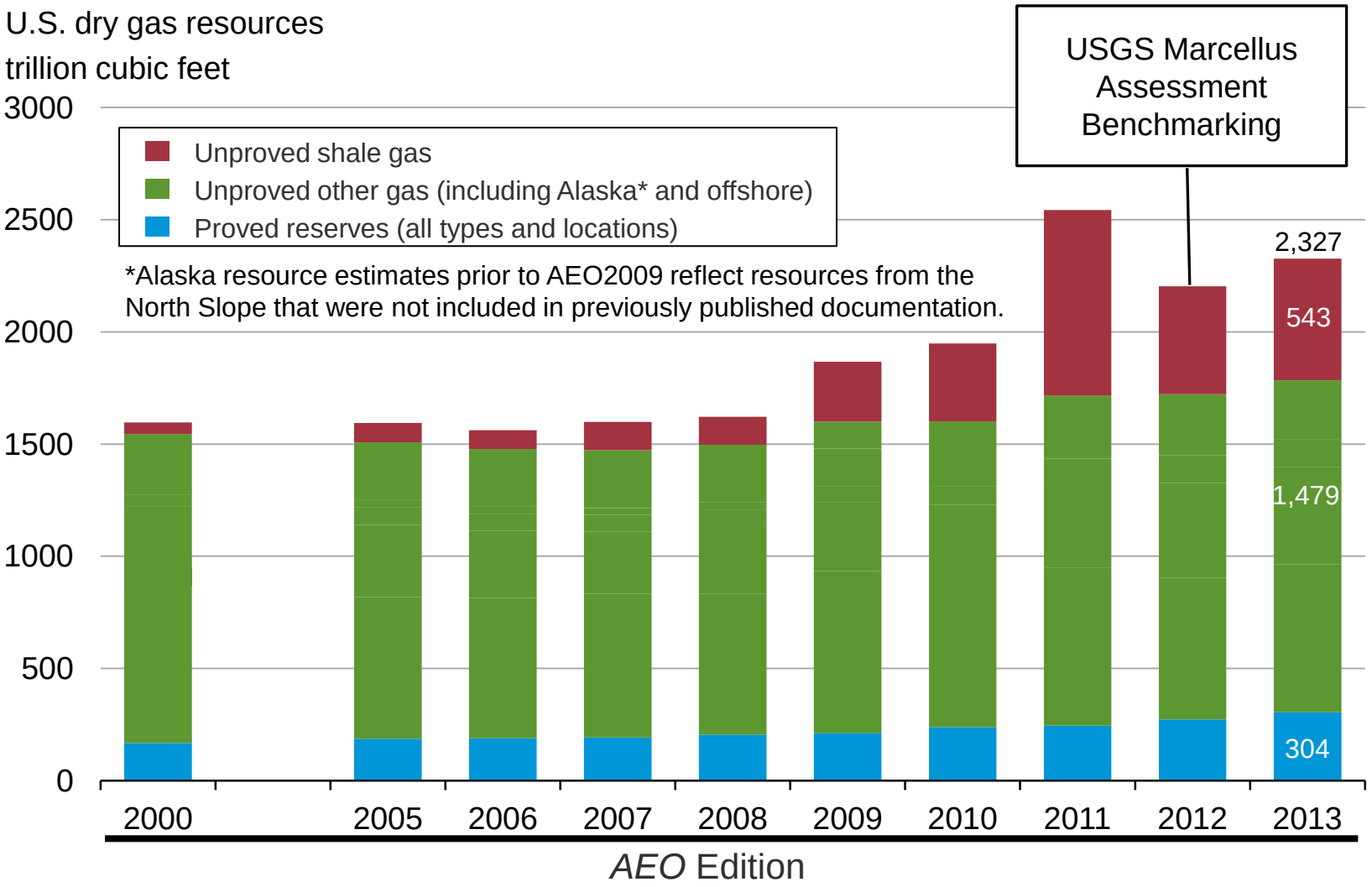
× % area with potential

× distribution of EUR/well
(see previous slide, this is the area under the curve for an individual well)

= undiscovered TRR

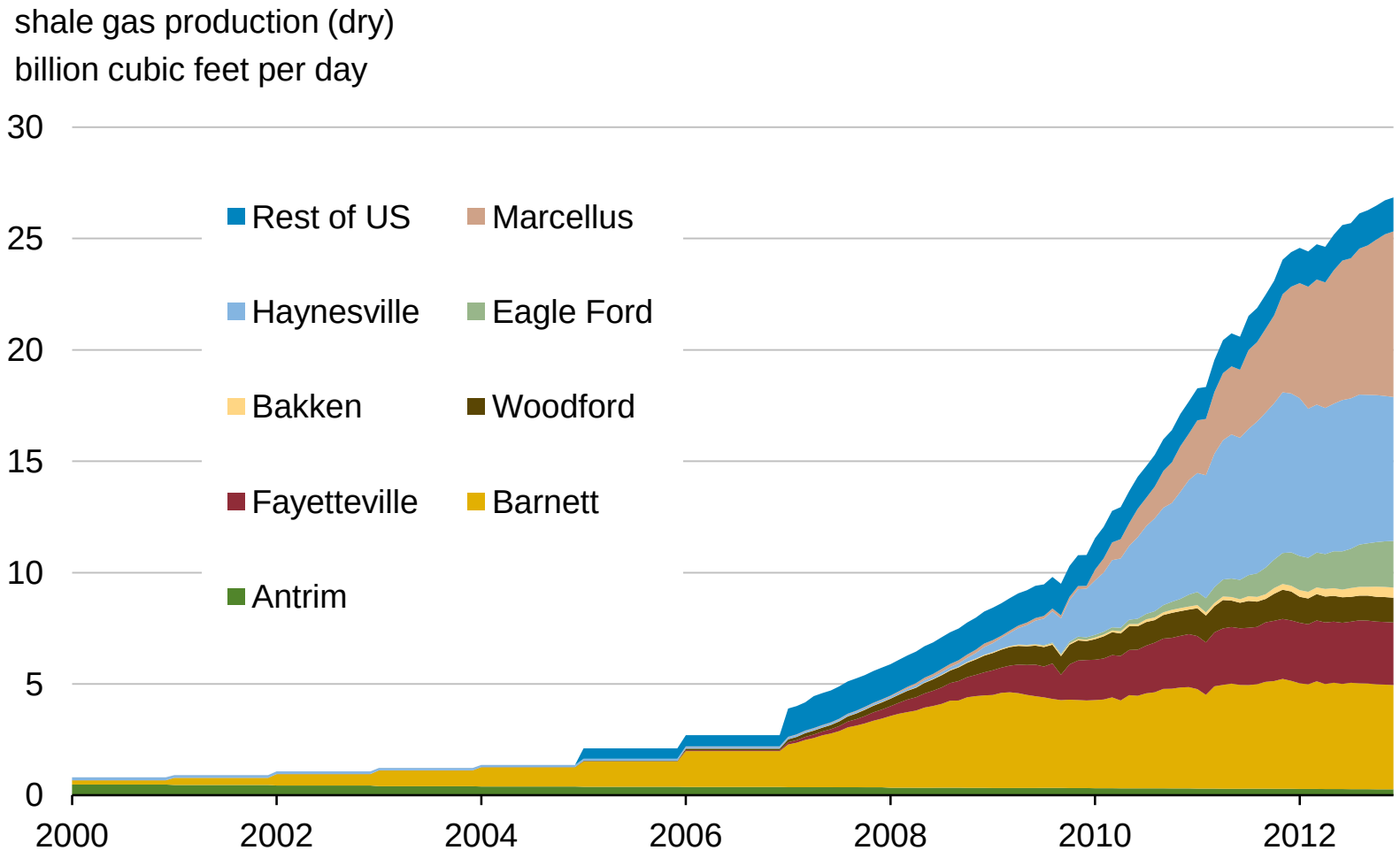
U.S. Shale Gas

Technically recoverable natural gas resources reflect new information, a combination of assessments and EIA updates



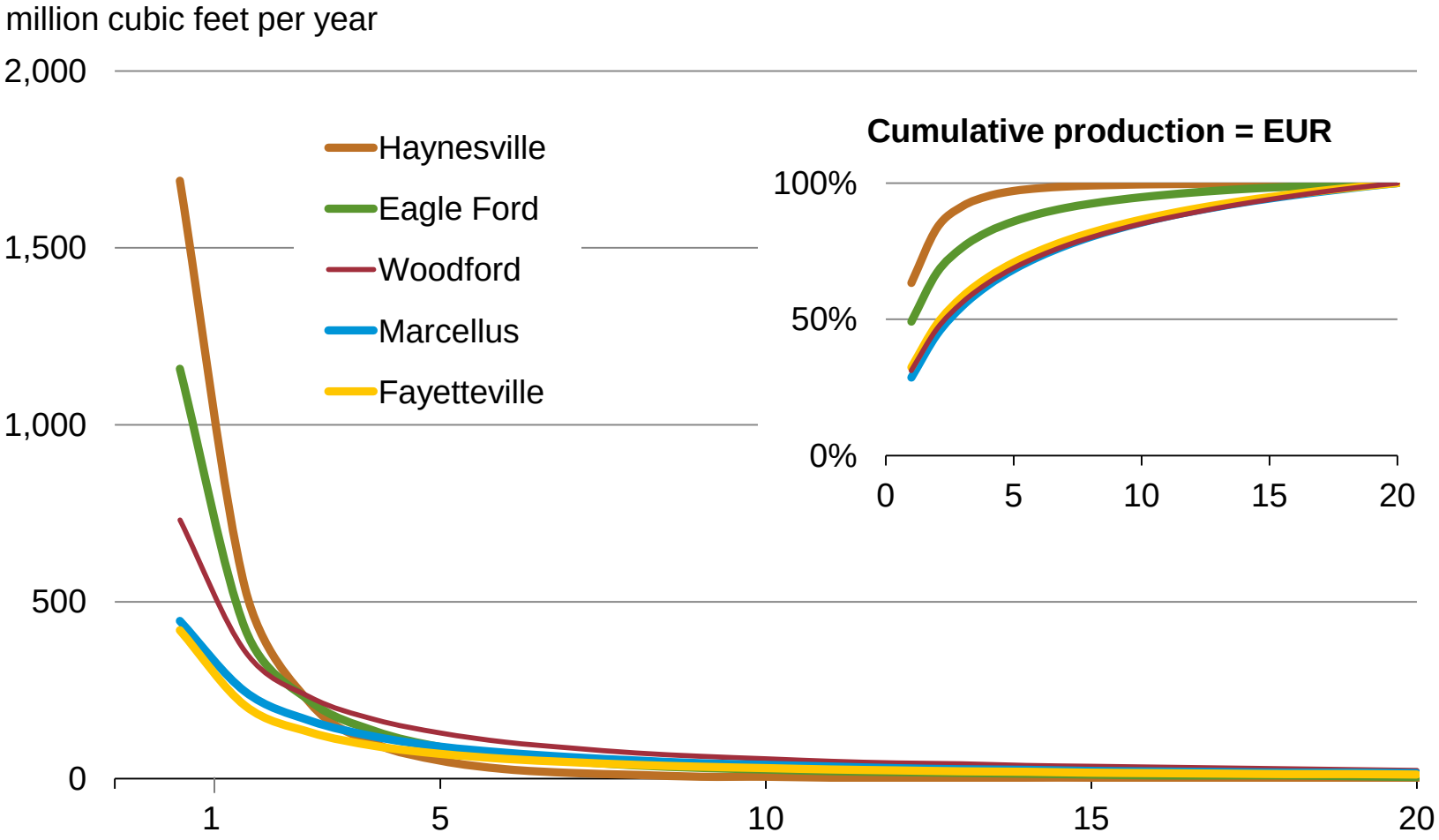
Source: EIA, Annual Energy Outlook 2013 Early Release

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



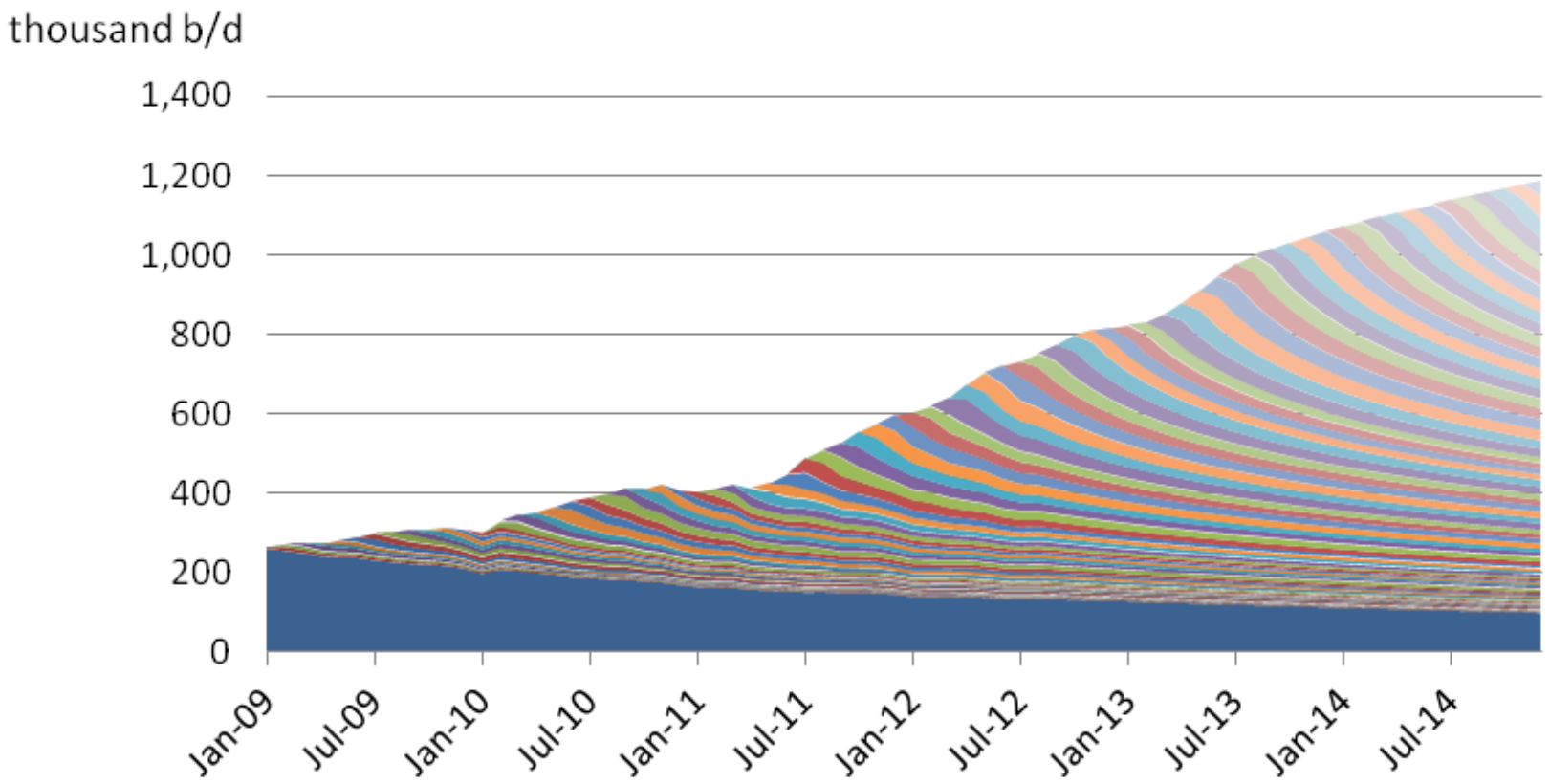
Sources: LCI Energy Insight gross withdrawal estimates as of December 2012 and converted to dry production estimates with EIA-calculated average gross-to-dry shrinkage factors by state and/or shale play.

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

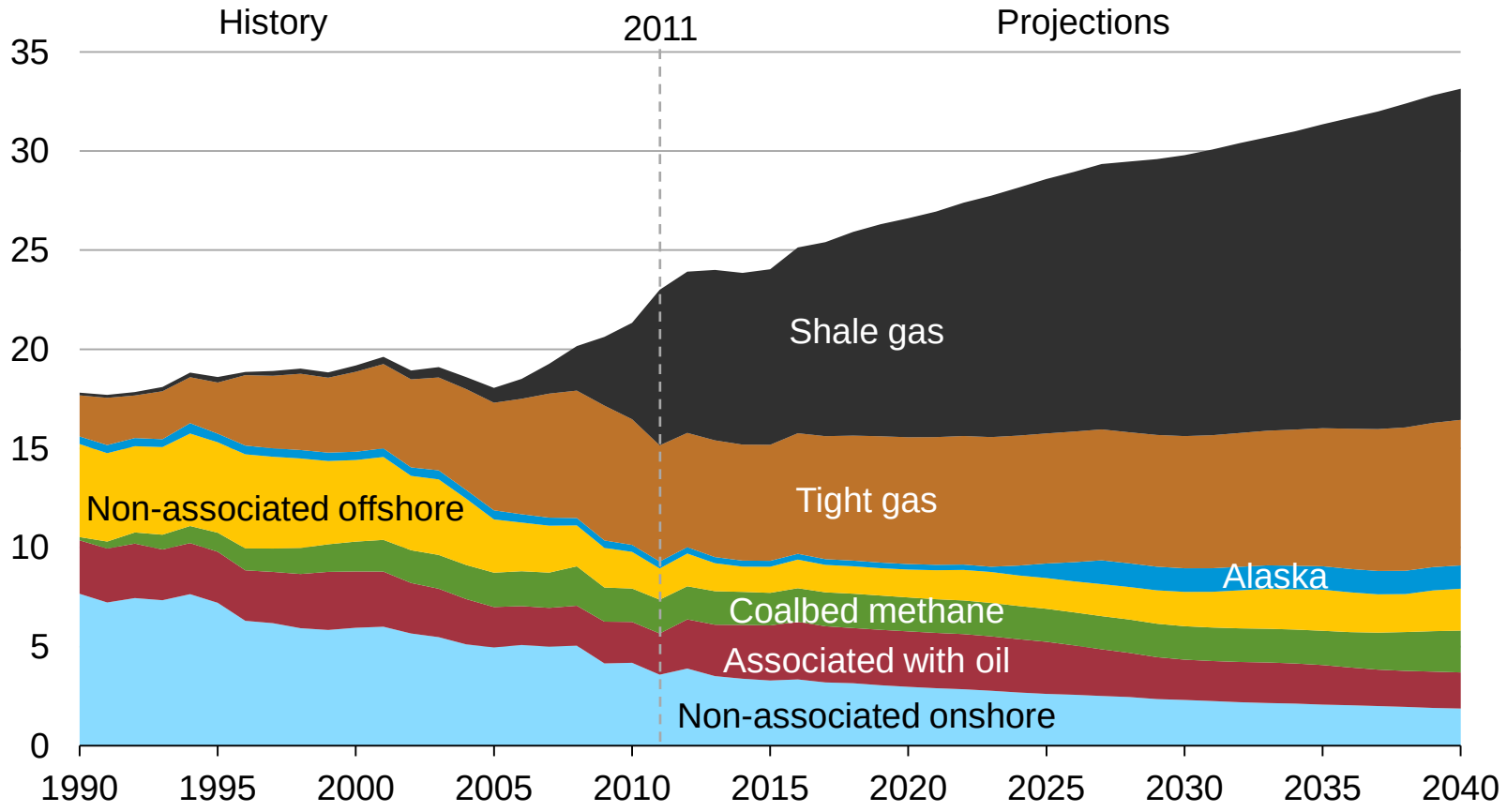
For example: Oil production by monthly vintage of wells in the Williston Basin



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

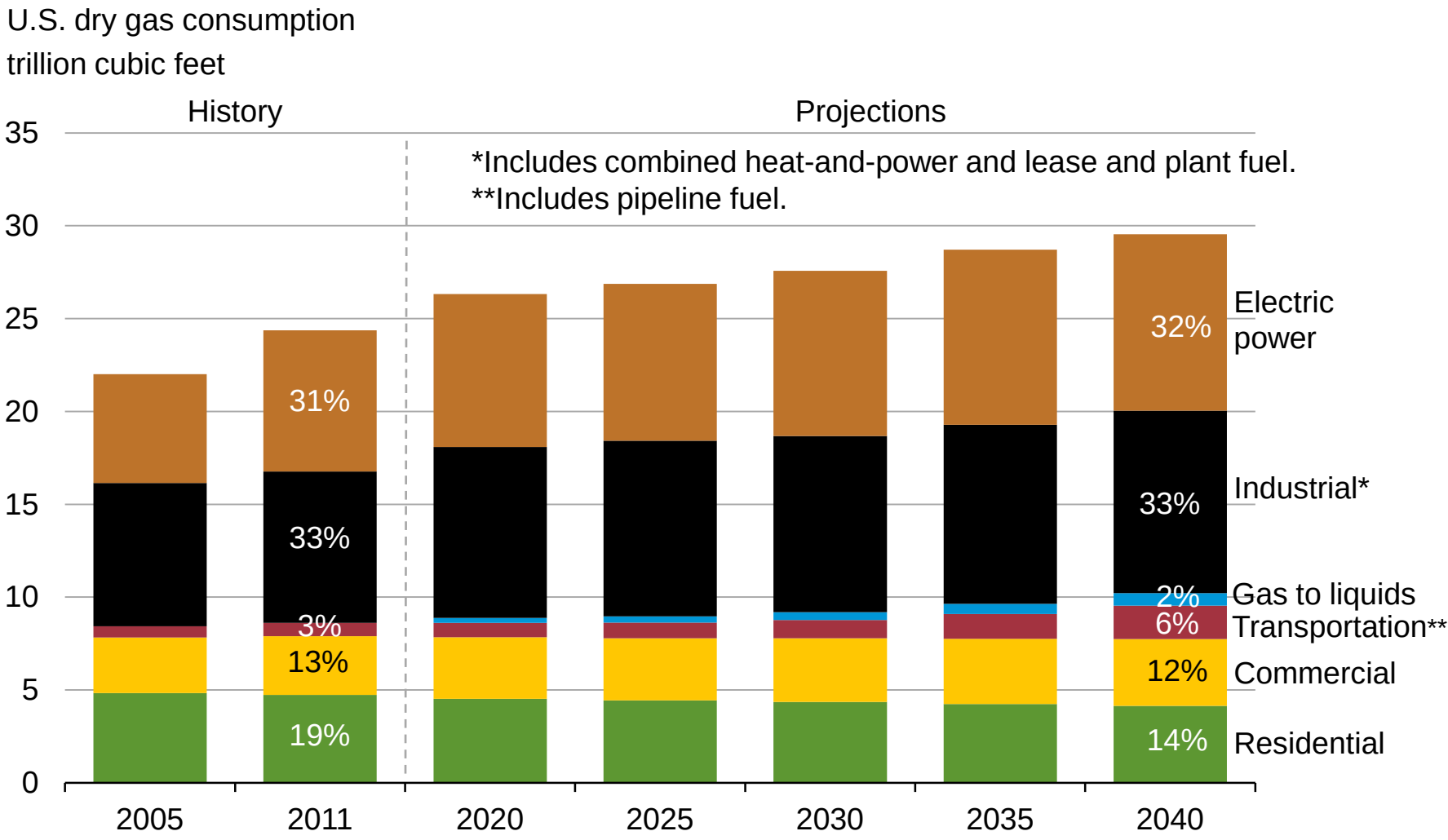
Shale gas leads growth in total gas production through 2040

U.S. dry natural gas production
trillion cubic feet



Source: EIA, Annual Energy Outlook 2013 Early Release

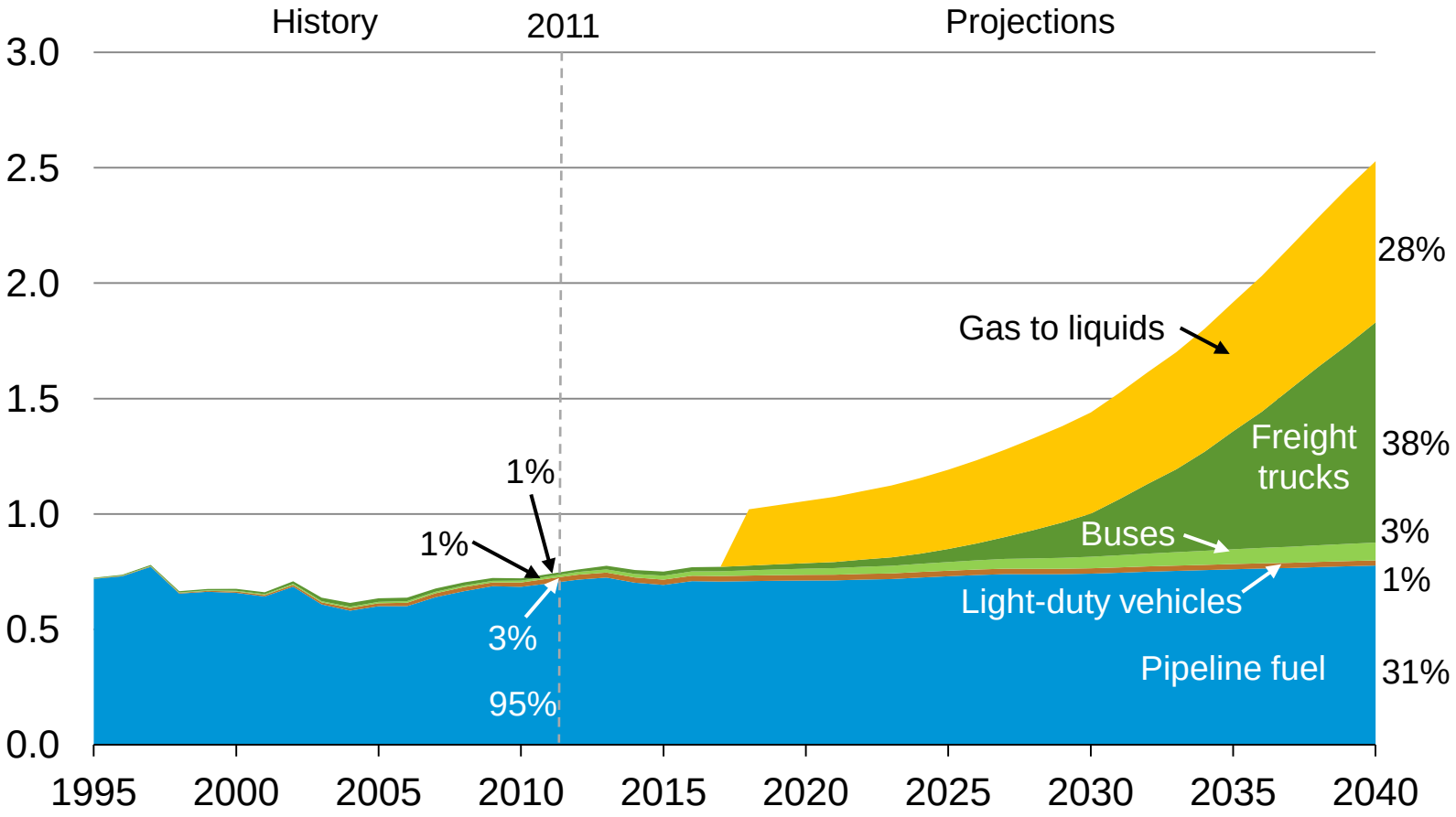
Natural gas consumption is quite dispersed with electric power, industrial, and transportation use driving future demand growth



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?

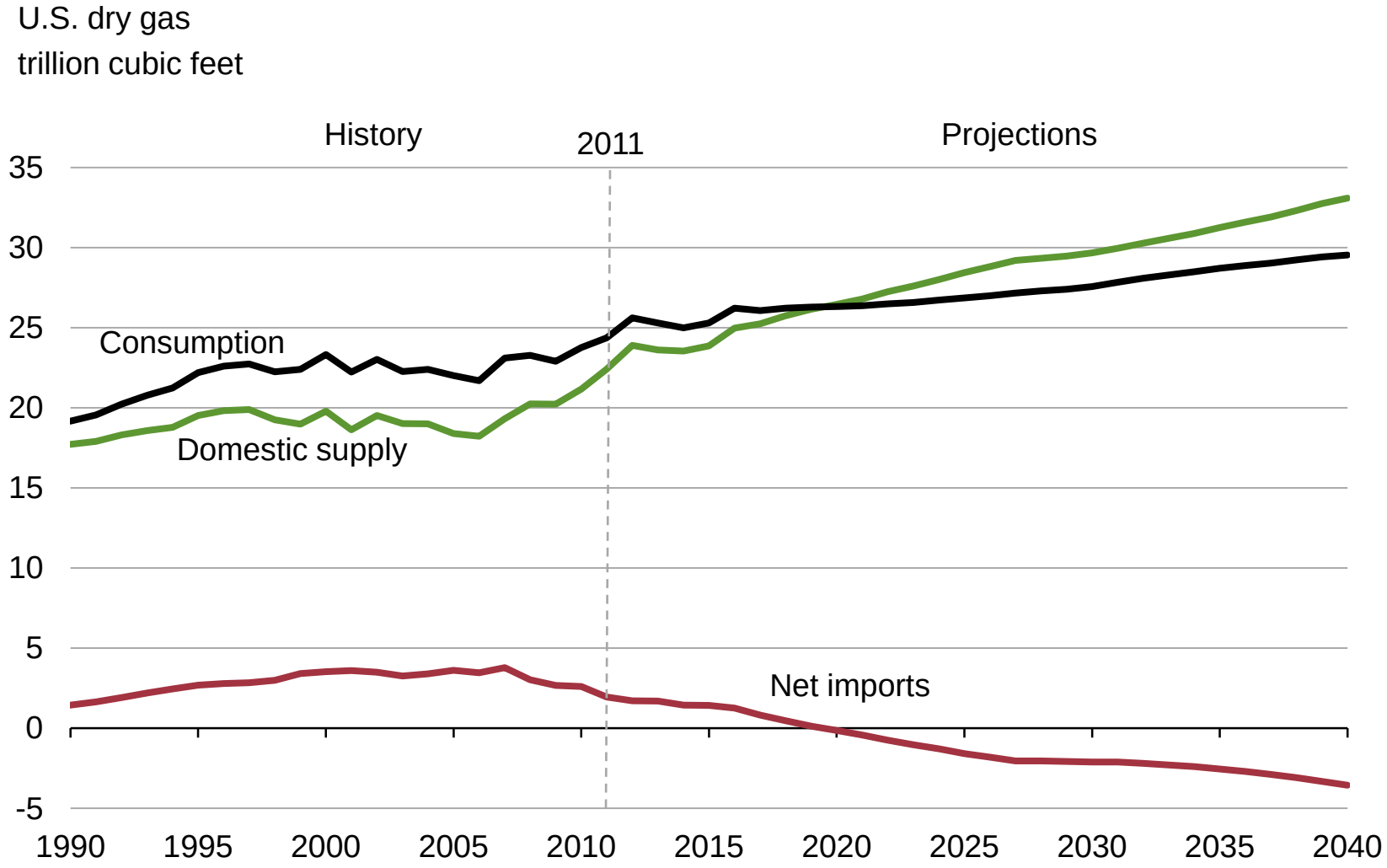
U.S. natural gas consumption
quadrillion Btu



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

Source: EIA, Annual Energy Outlook 2013 Early Release

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



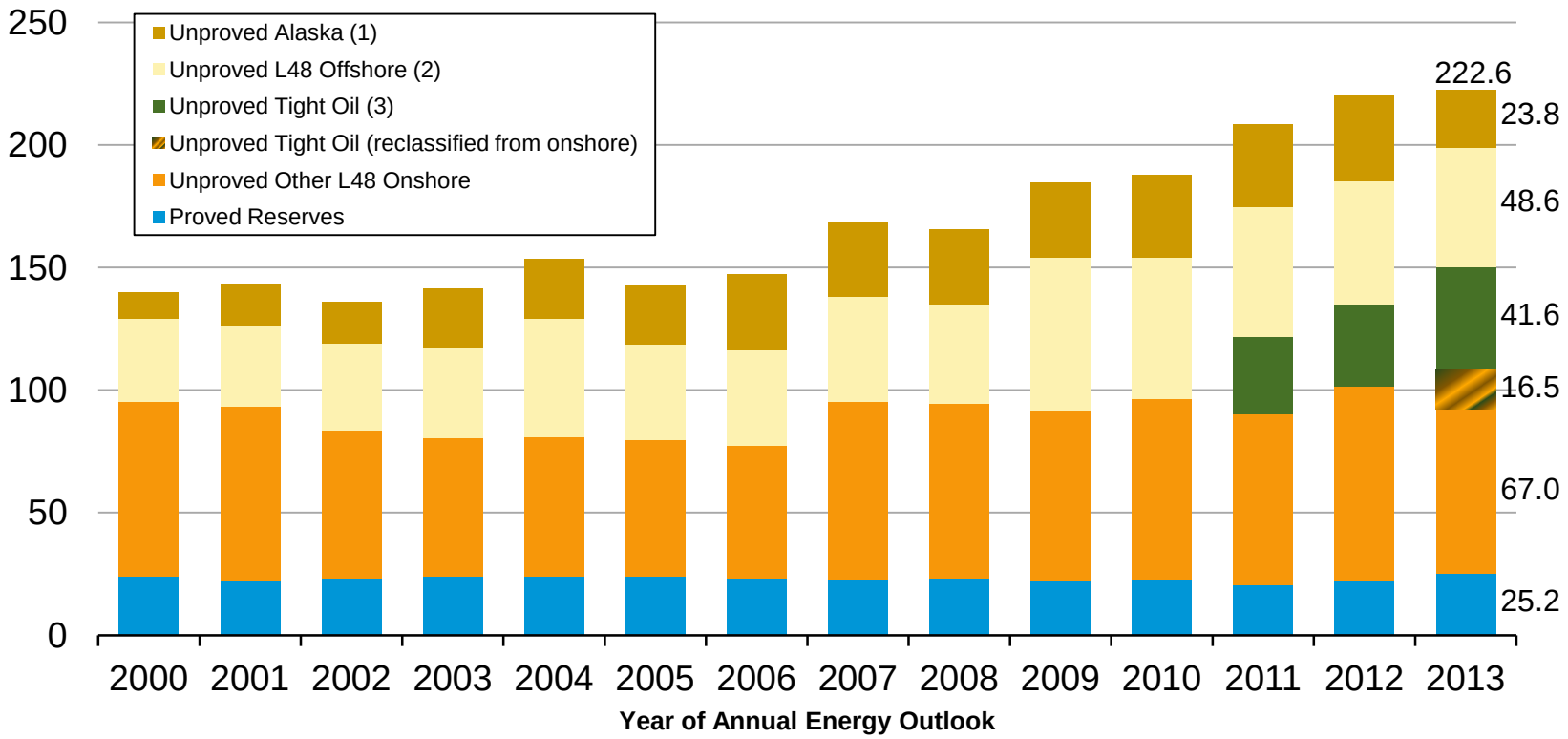
Source: EIA, Annual Energy Outlook 2013 Early Release

U.S. Tight Oil

Multiple factors have contributed to U.S. crude oil resource estimate increases over the years, with tight oil contributing recently

U.S. crude oil and lease condensate resources in non-prohibited areas

billion barrels



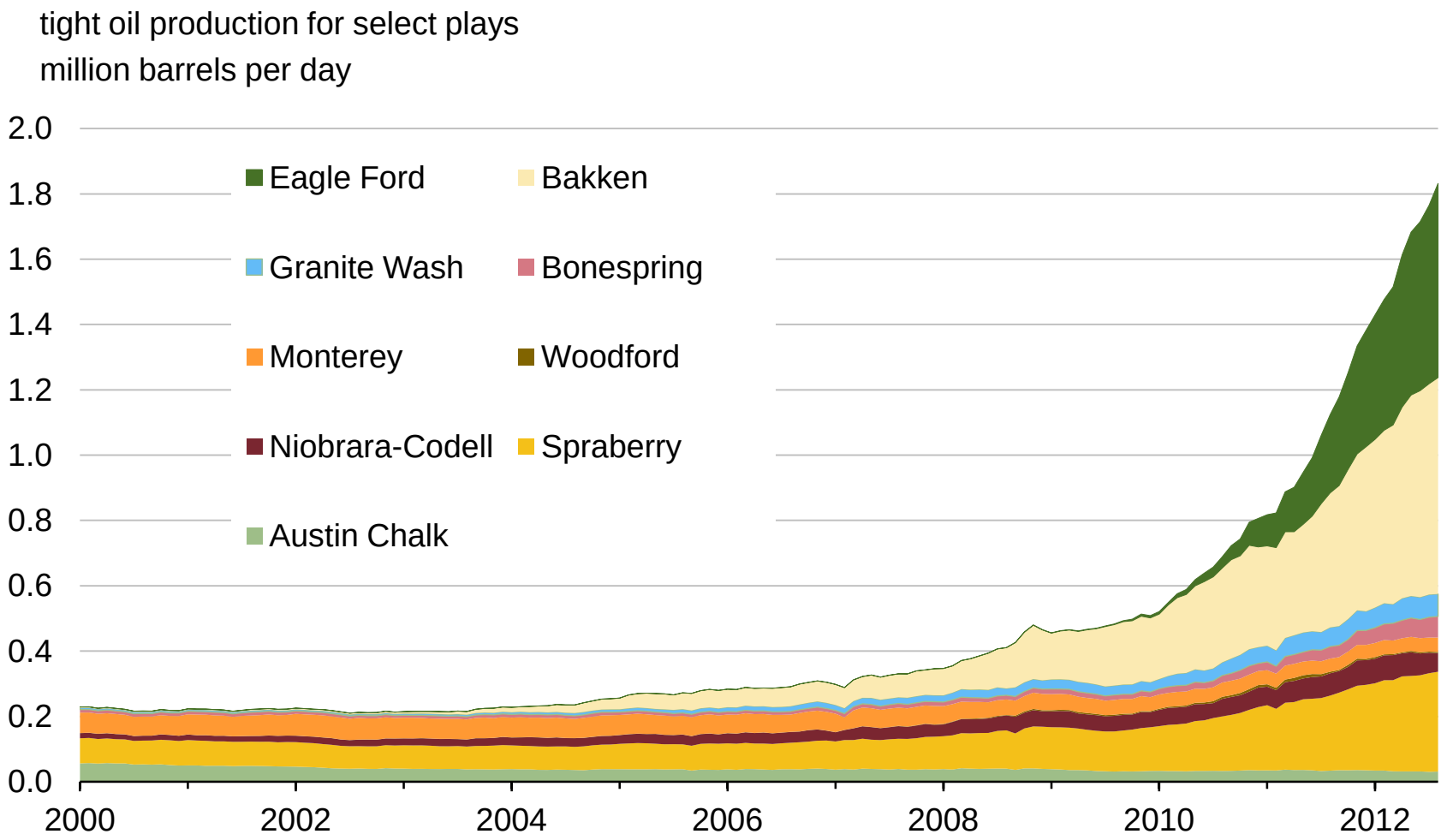
(1) The USGS reduced NPR-A resource estimates, which is responsible for the lower AEO2013 Alaska resources.

(2) Prior to AEO2009, resources in Pacific, Atlantic, and Eastern GOM OCS were under moratoria and not included.

(3) Includes shale oil. Prior to AEO2011, tight oil is included in unproved other lower-48 onshore category.

Source: EIA, Annual Energy Outlook 2013 Early Release

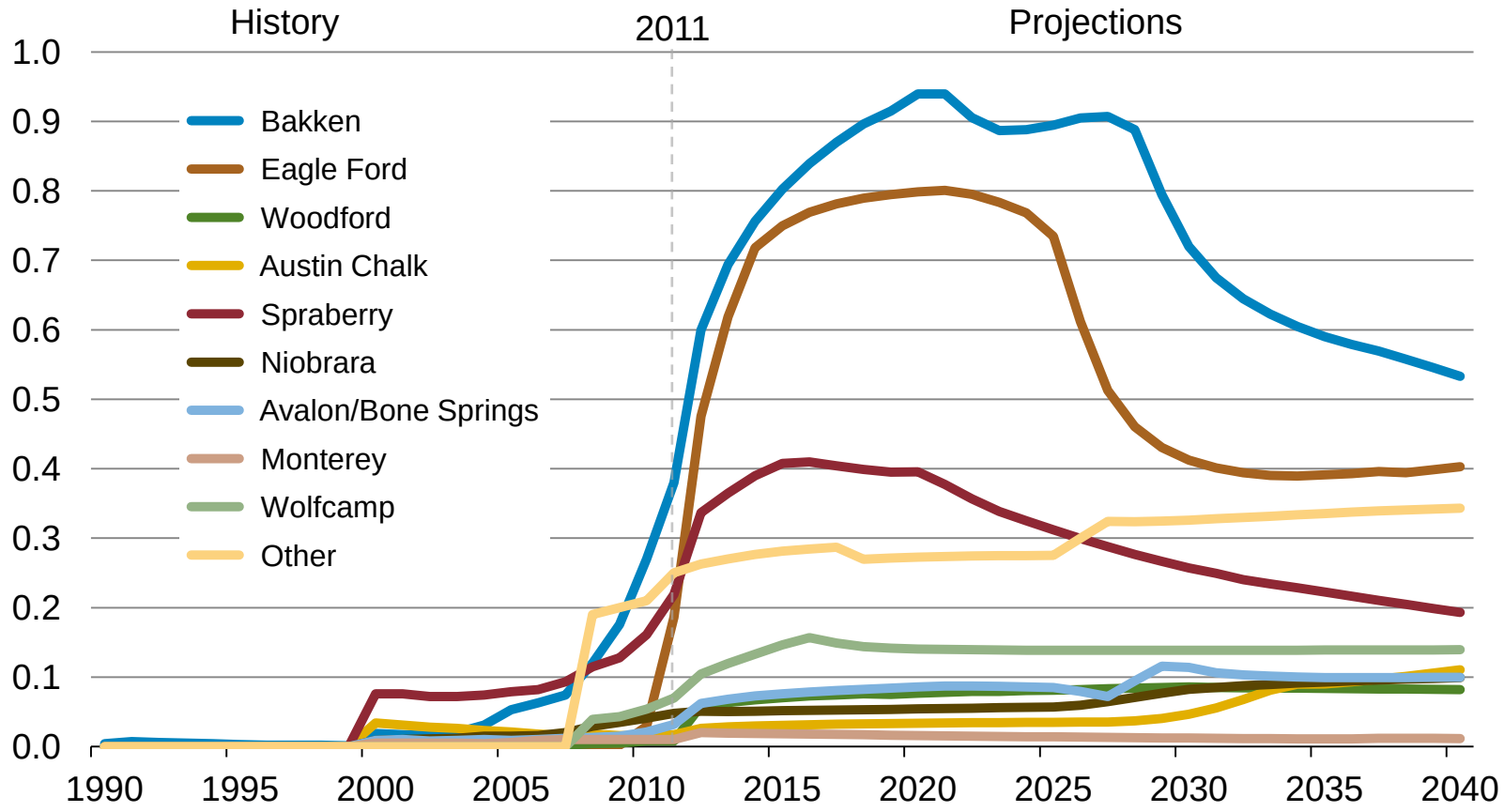
Domestic production of tight oil has grown dramatically over the past few years



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

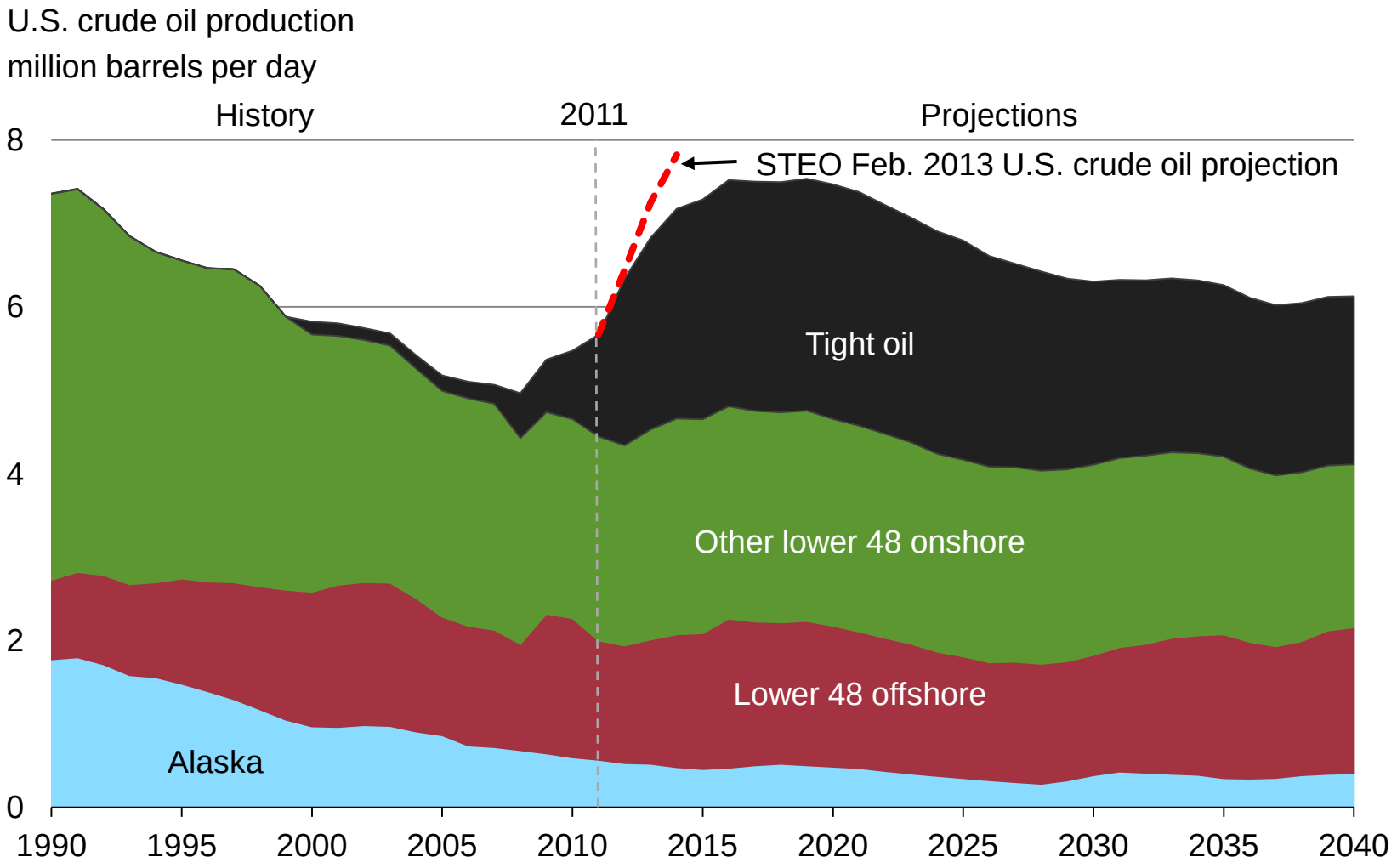
U.S. tight oil production by selected plays

U.S. crude oil production
million barrels per day



Source: EIA, Annual Energy Outlook 2013 Early Release

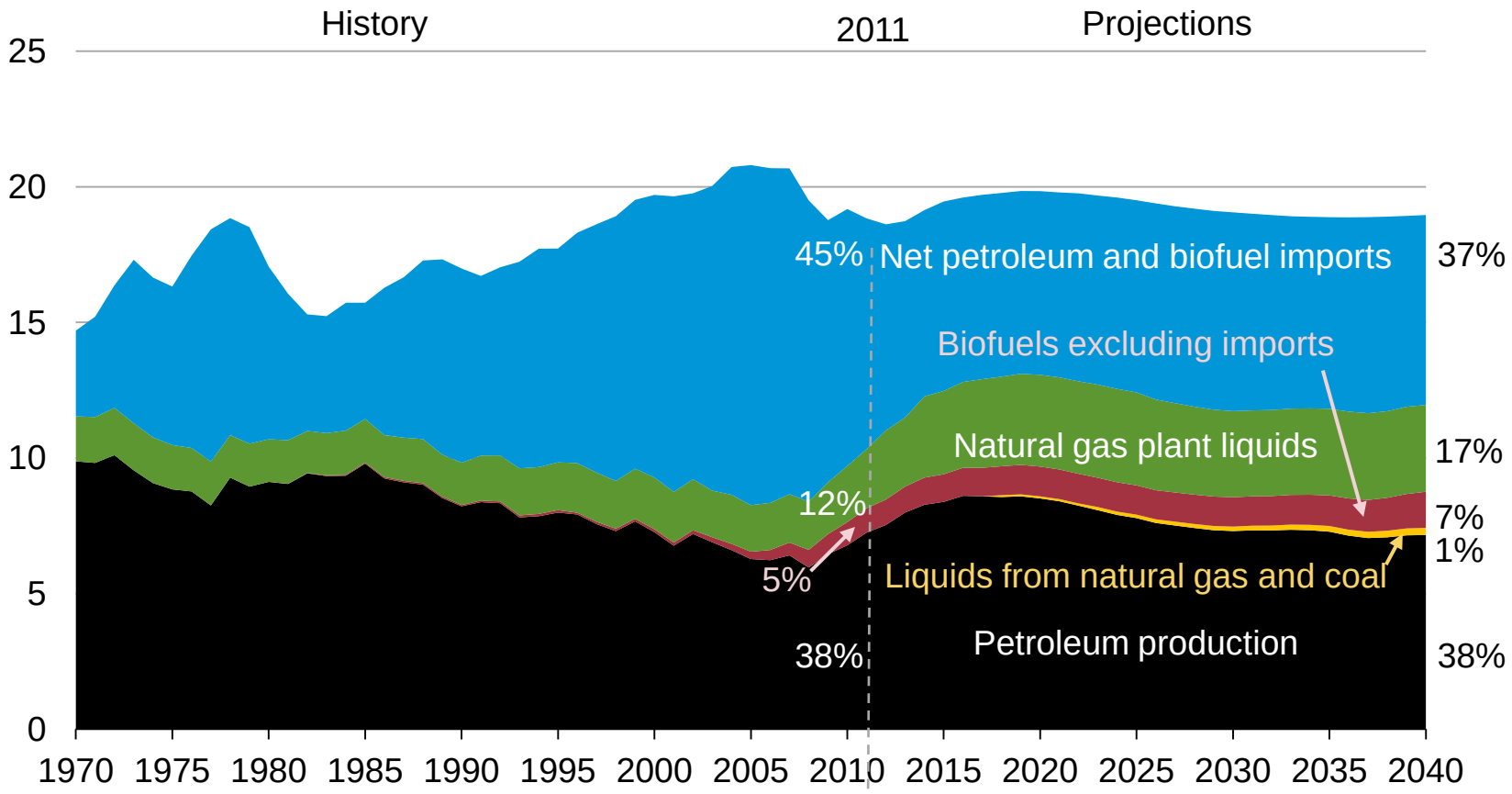
U.S. tight oil production leads a growth in domestic production of 2.6 million barrels per day between 2008 and 2019



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

U.S. import share of liquid fuels declines due to increased production of tight oil and gas liquids, and greater fuel efficiency

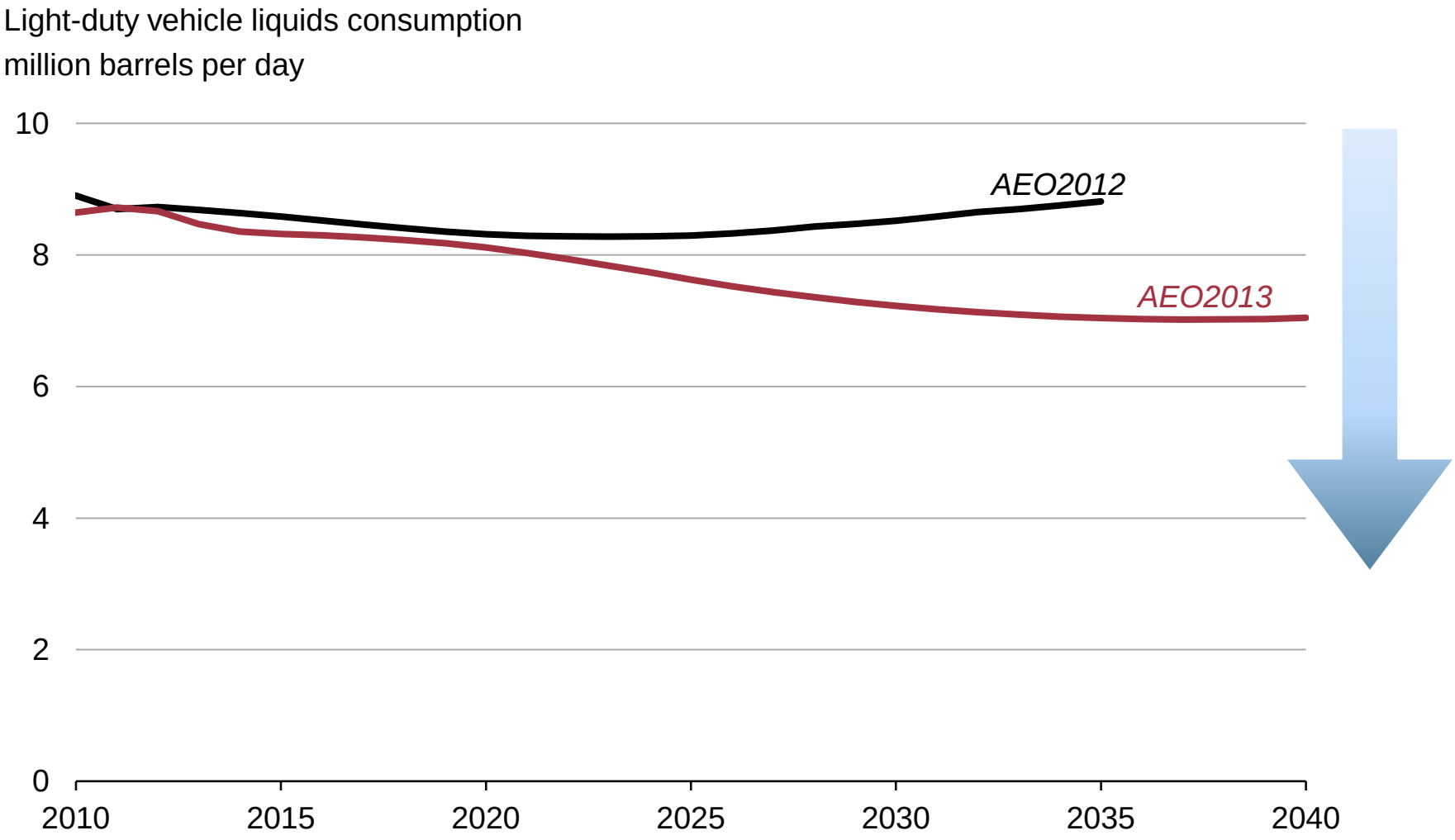
U.S. liquid fuels supply
million barrels per day



Source: EIA, Annual Energy Outlook 2013 Early Release

Note: Petroleum production includes: crude oil, lease condensates, refinery gain, stock changes

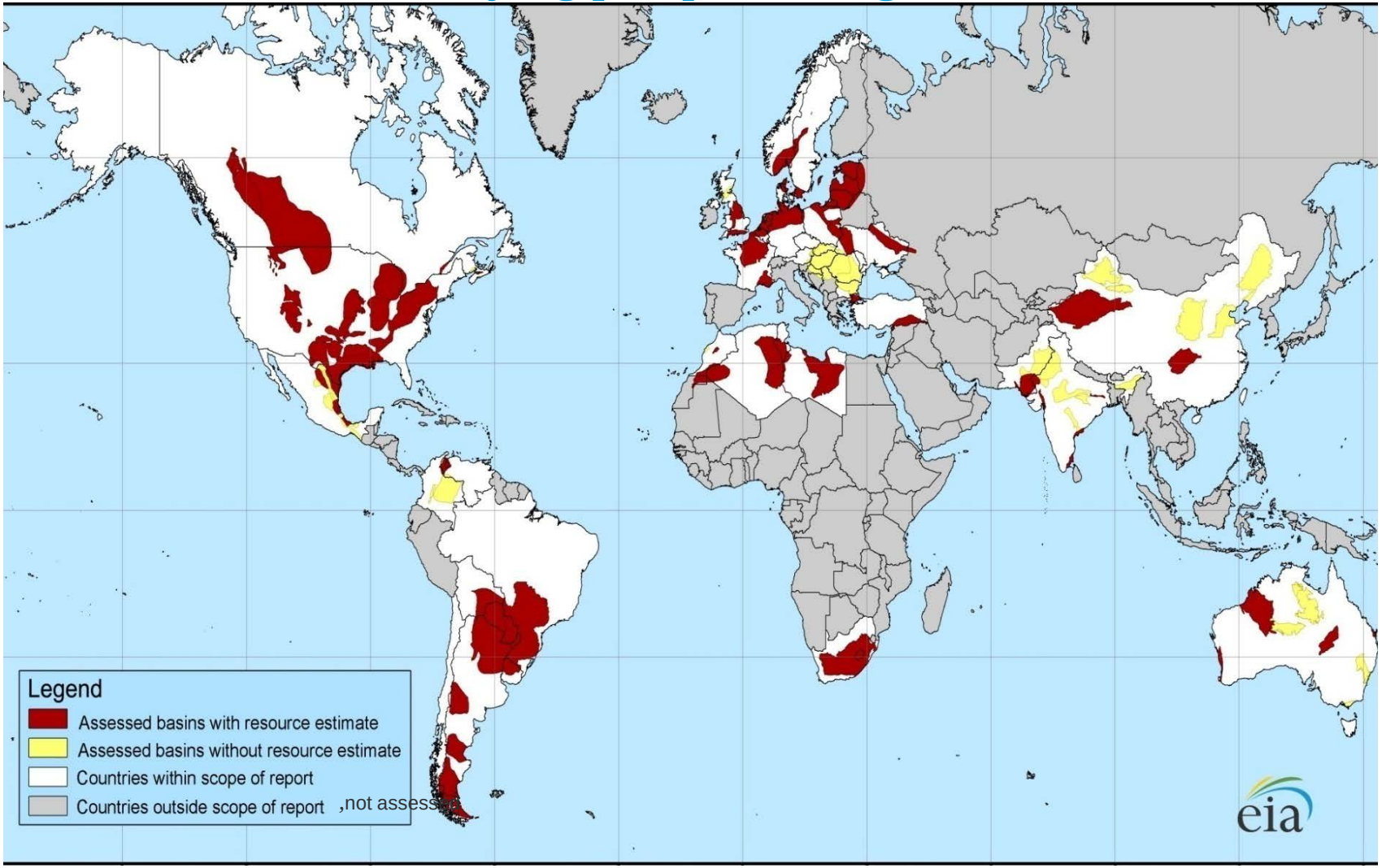
More stringent standards for liquids consumption in light-duty vehicles made a big difference in EIA's demand projections



Source: EIA, Annual Energy Outlook 2013 Early Release

Global Shale Gas and Tight Oil

EIA/ARI study to update & expand coverage of shale gas assessment and identifying prospective tight oil formations



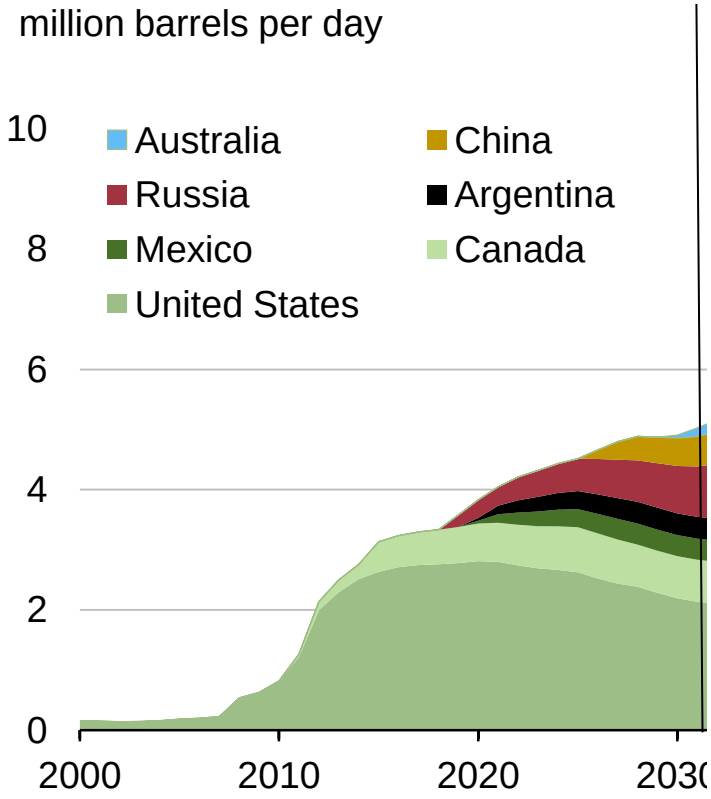
Source: U.S. Energy Information Administration www.eia.gov/analysis/studies/worldshalegas/

Uncertainties that could slow global growth of shale gas and tight oil

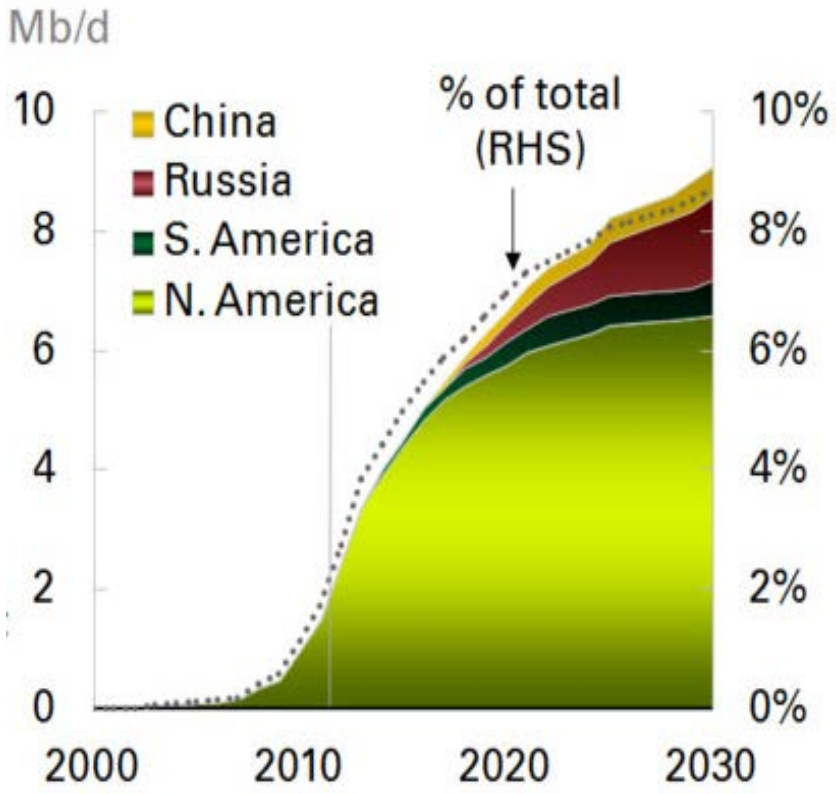
- Resource quantities and distribution
- Surface vs. mineral rights
- Risk appetite of industry participants
- Infrastructure/technology
- Environmental constraints

Global tight oil production comparisons

IEO2013 DRAFT



BP Energy Outlook 2030



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

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