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

for

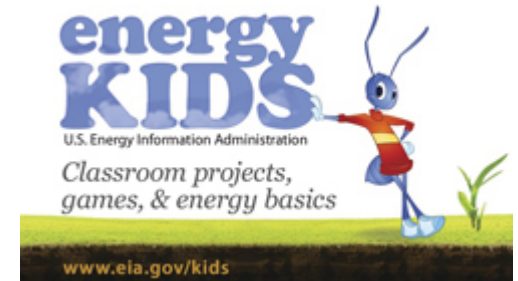*The Energy Council*

March 09, 2013 | Washington, DC

by

Adam Sieminski, Administrator

EIA's mission and main functions

Independent Statistical and Analytical agency within the U.S. Department of Energy

- EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment.

- ***By law,*** **its data, analyses, and forecasts are independent of approval by any other officer or employee of the U.S. Government**
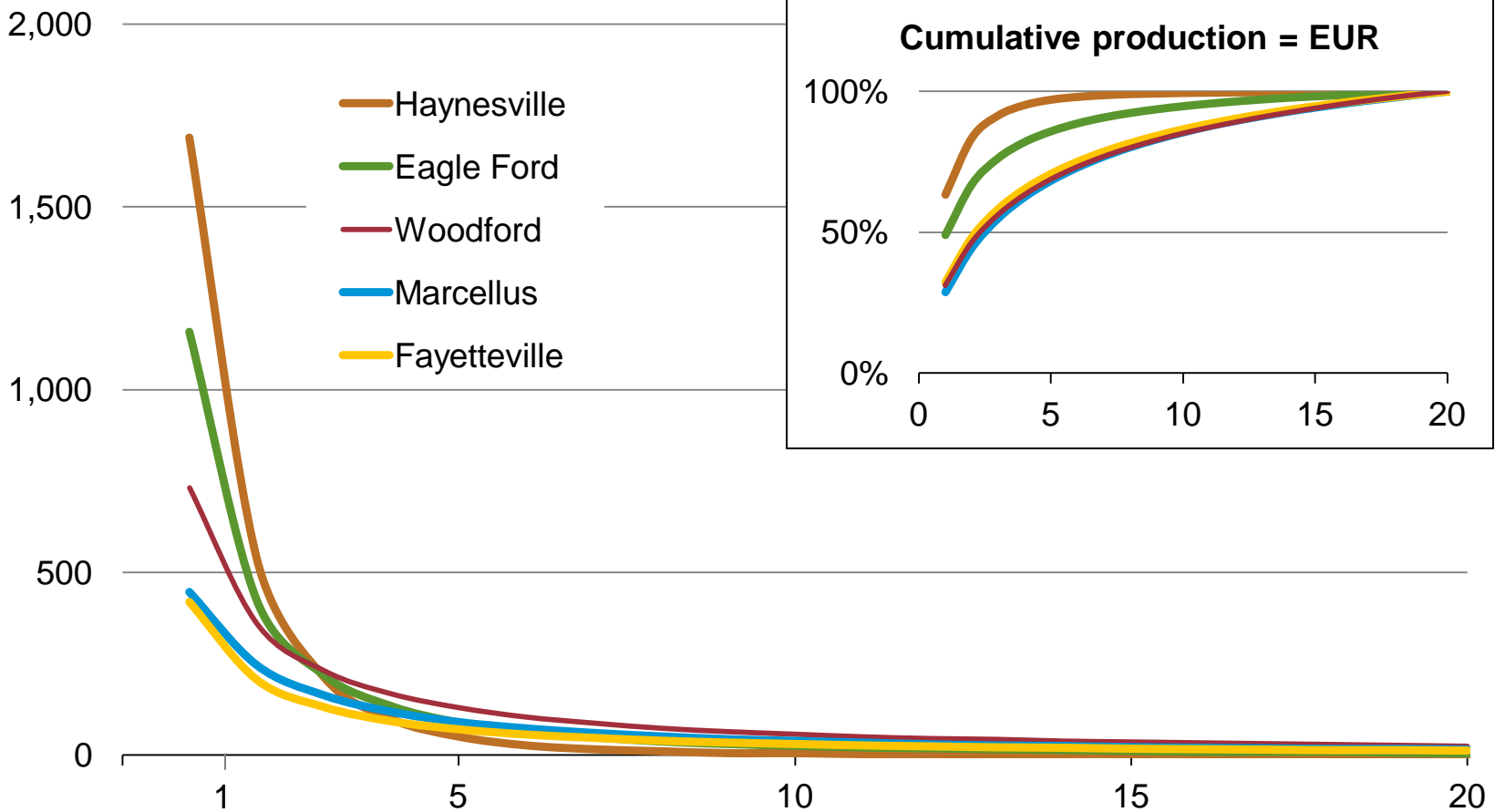
[EIA] …is the gold standard for energy data around the world, and the accessibility of it is so much greater than other places – Dan Yergin, Platts Inside Energy

energy **KIDS**
U.S. Energy Information Administration
Classroom projects, games, & energy basics
www.eia.gov/kids

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

million cubic feet per year

Legend:
- Haynesville
- Eagle Ford
- Woodford
- Marcellus
- Fayetteville

Inset: **Cumulative production = EUR**

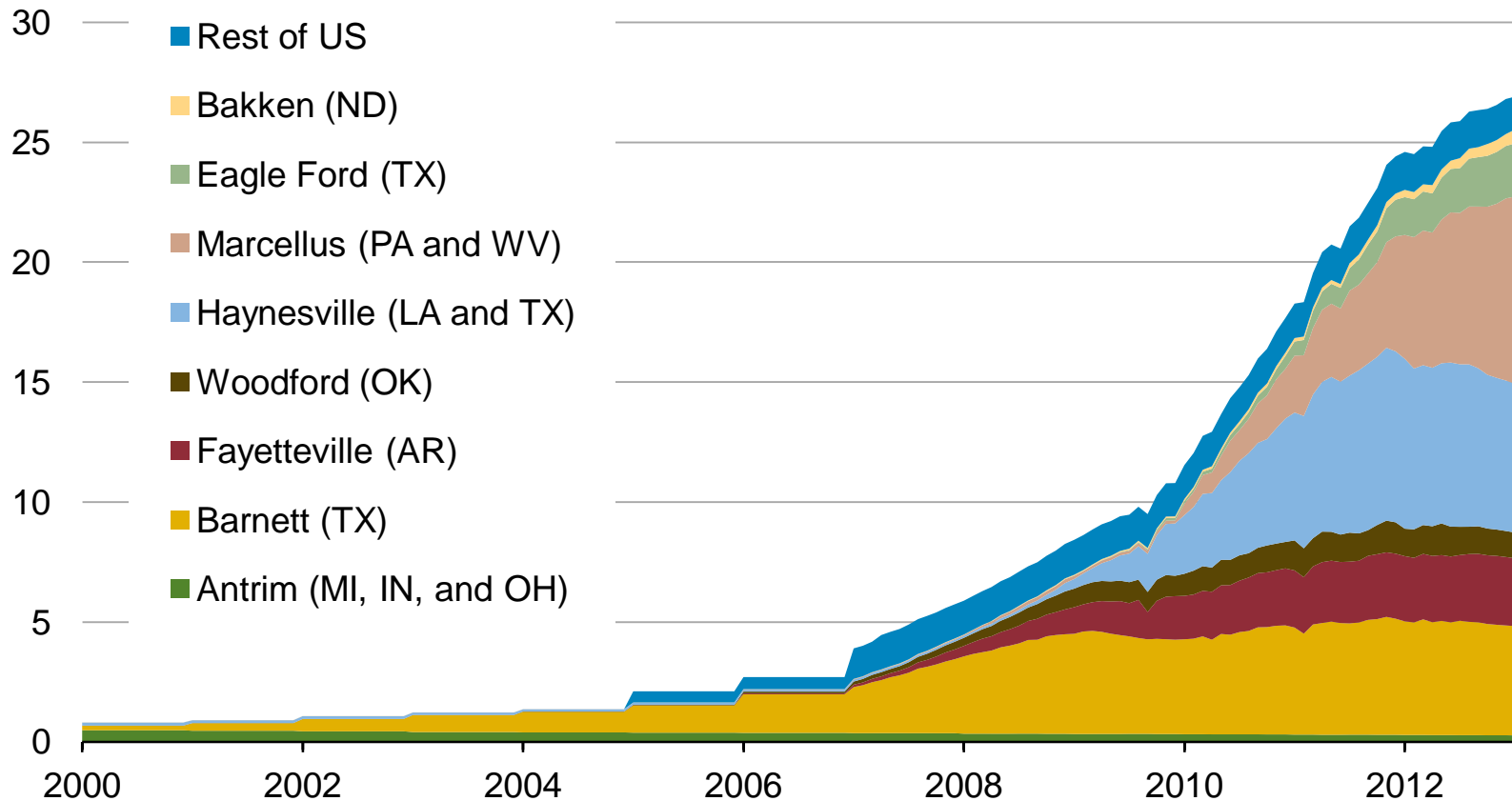*Source: EIA, Annual Energy Outlook 2012*

For example: Oil production by monthly vintage of wells in the Williston Basin
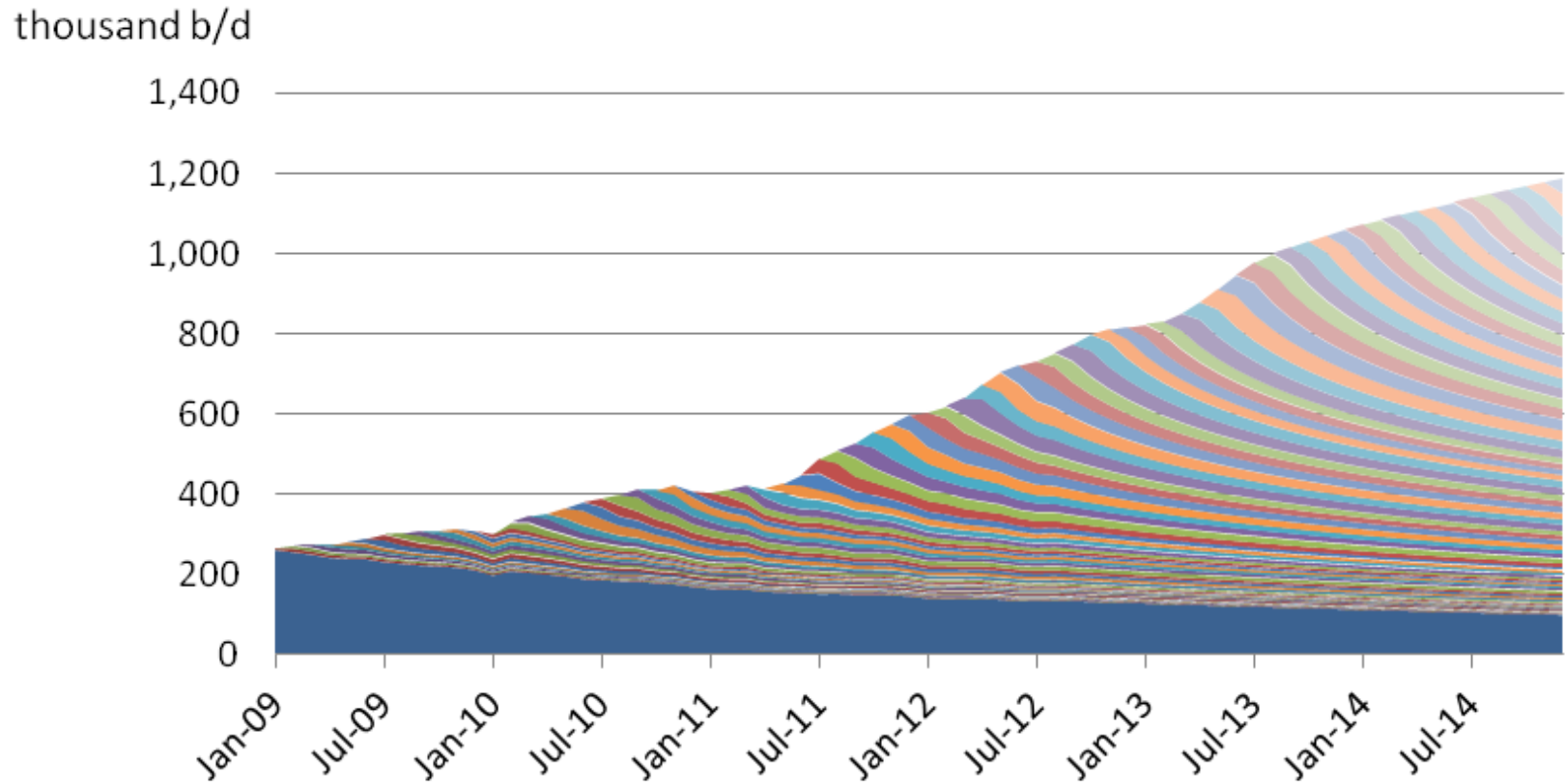
Source: DrillingInfo history through August 2012, EIA Short-Term Energy Outlook, February 2013 forecast

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

shale gas production (dry)
billion cubic feet per day

Legend:
- Rest of US
- Bakken (ND)
- Eagle Ford (TX)
- Marcellus (PA and WV)
- Haynesville (LA and TX)
- Woodford (OK)
- Fayetteville (AR)
- Barnett (TX)
- Antrim (MI, IN, and OH)

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.

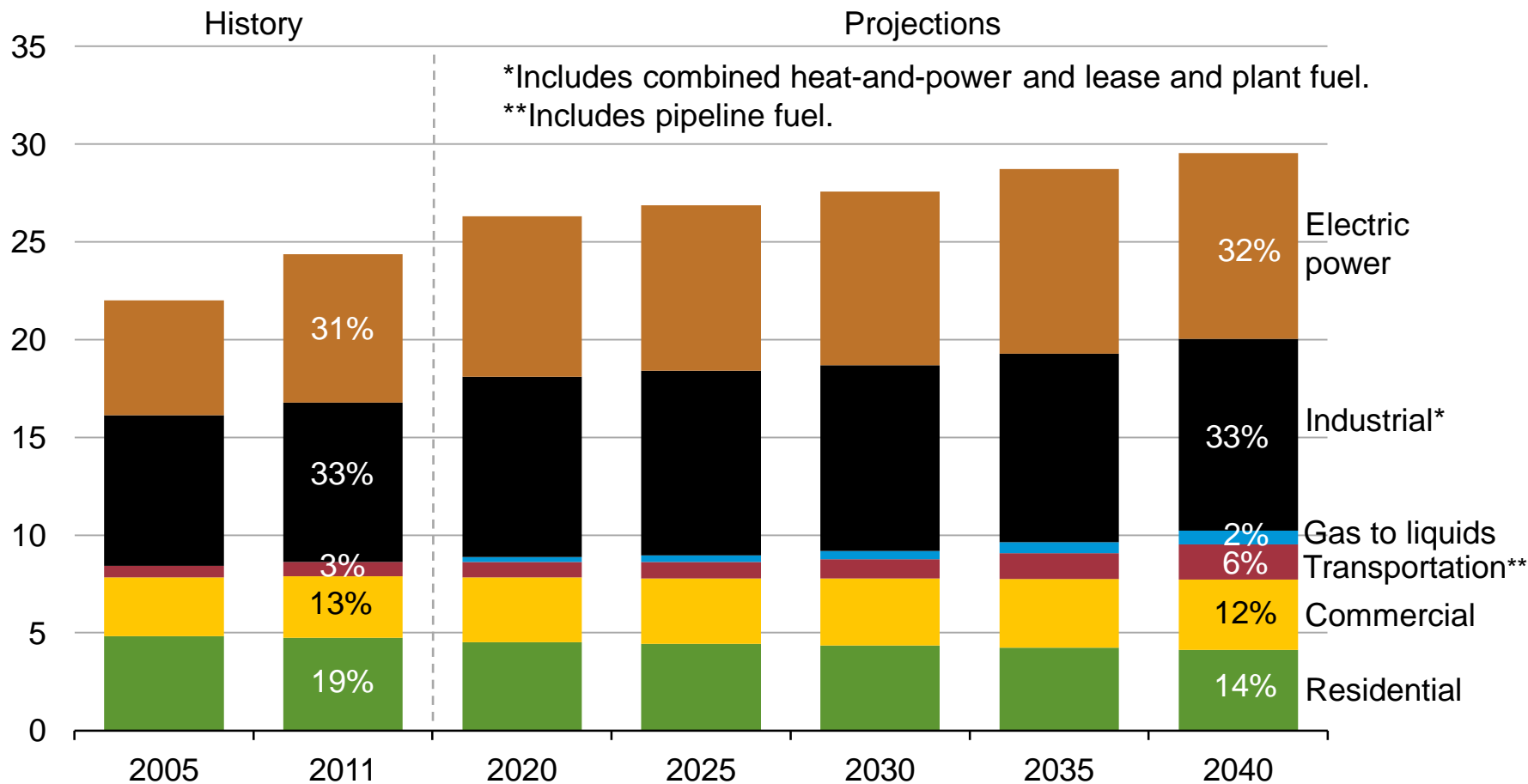Shale gas leads growth in total gas production through 2040

U.S. dry natural gas production
trillion cubic feet

Source: EIA, Annual Energy Outlook 2013 Early Release

Adam Sieminski, Energy Council
March 09, 2013
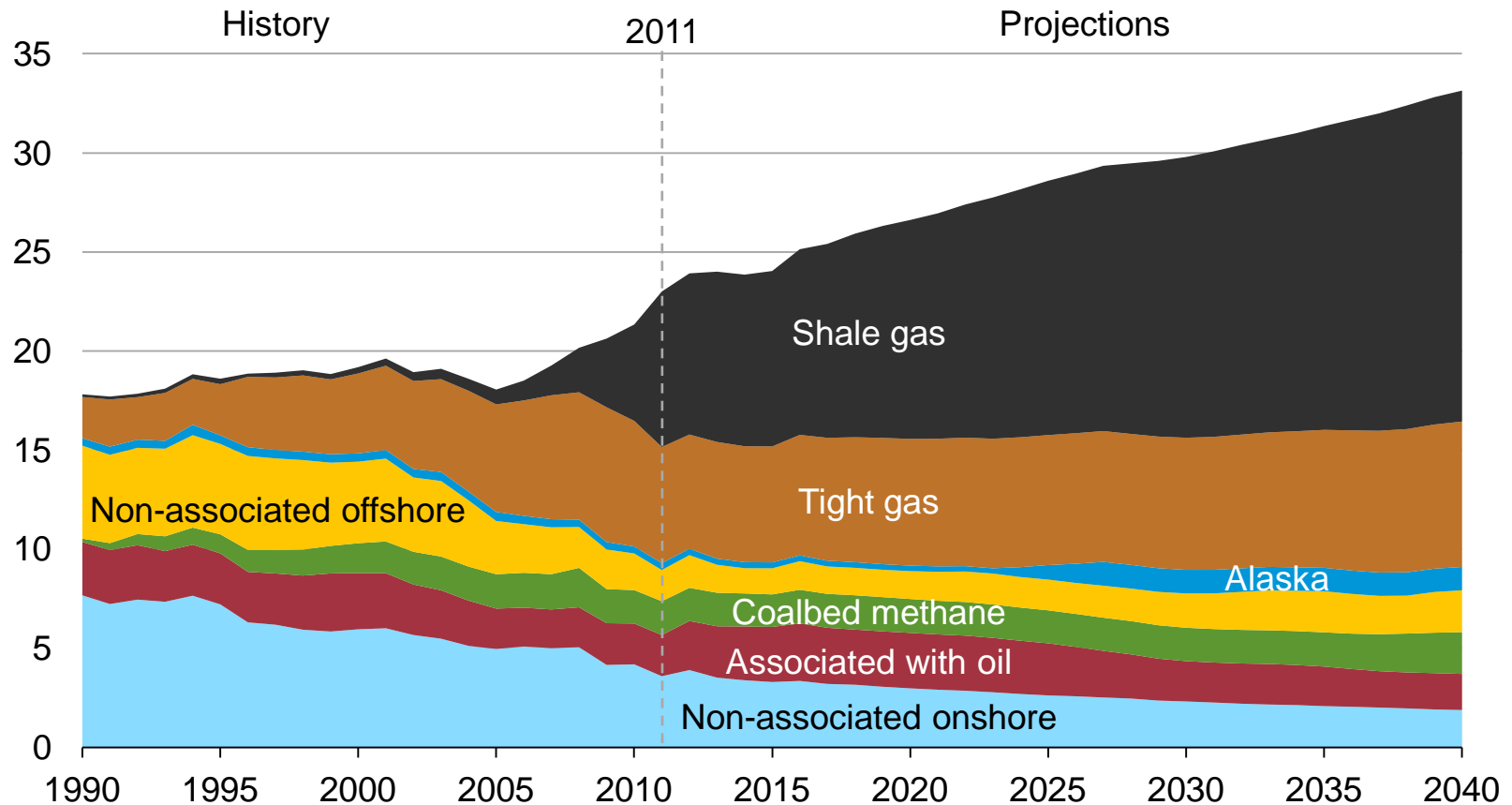
Natural gas consumption is quite dispersed, with electric power, industrial, and transportation use driving future demand growth

U.S. dry gas consumption
trillion cubic feet

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

Electric power
Industrial*
Gas to liquids
Transportation**
Commercial
Residential

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?
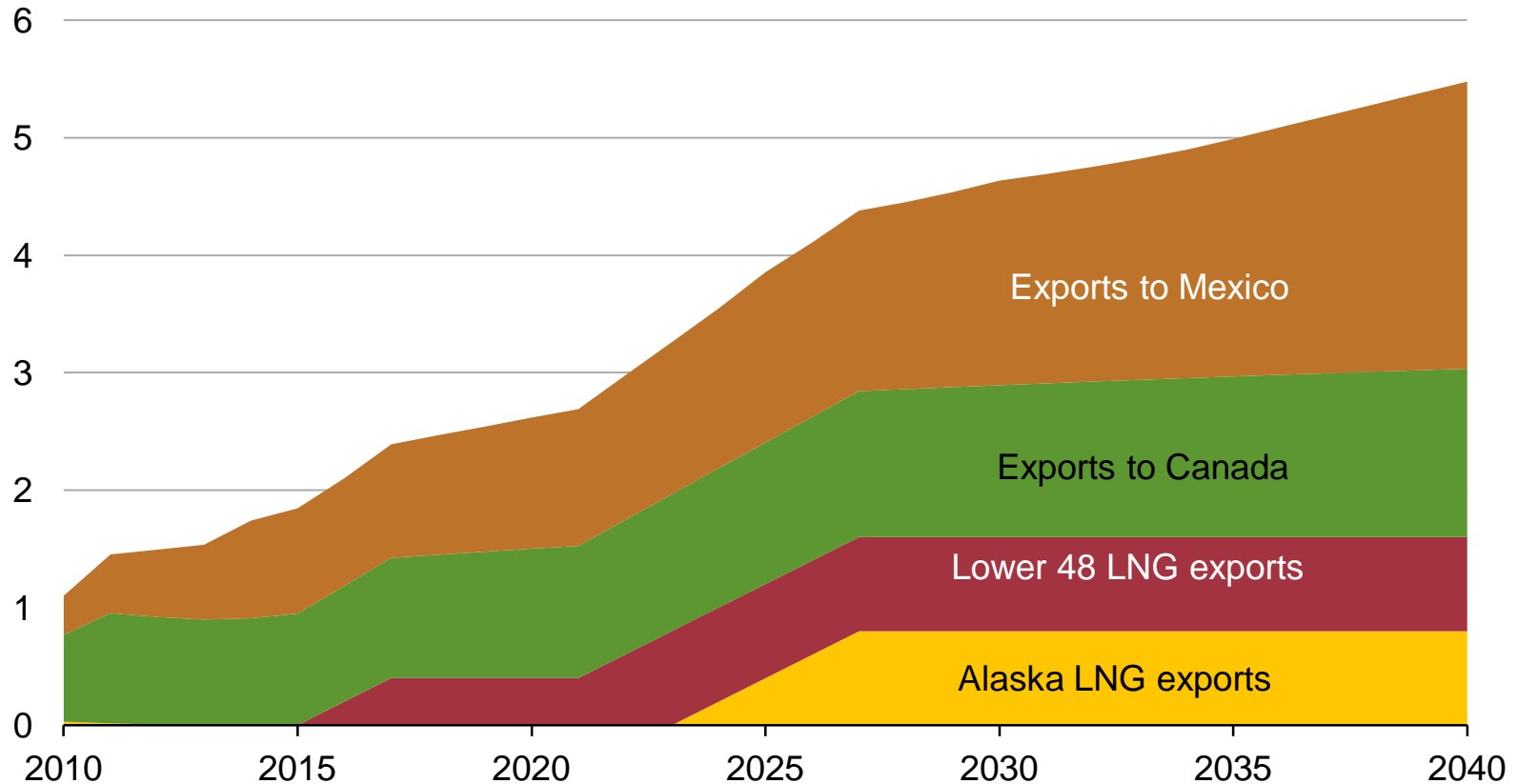
U.S. natural gas consumption
quadrillion Btu
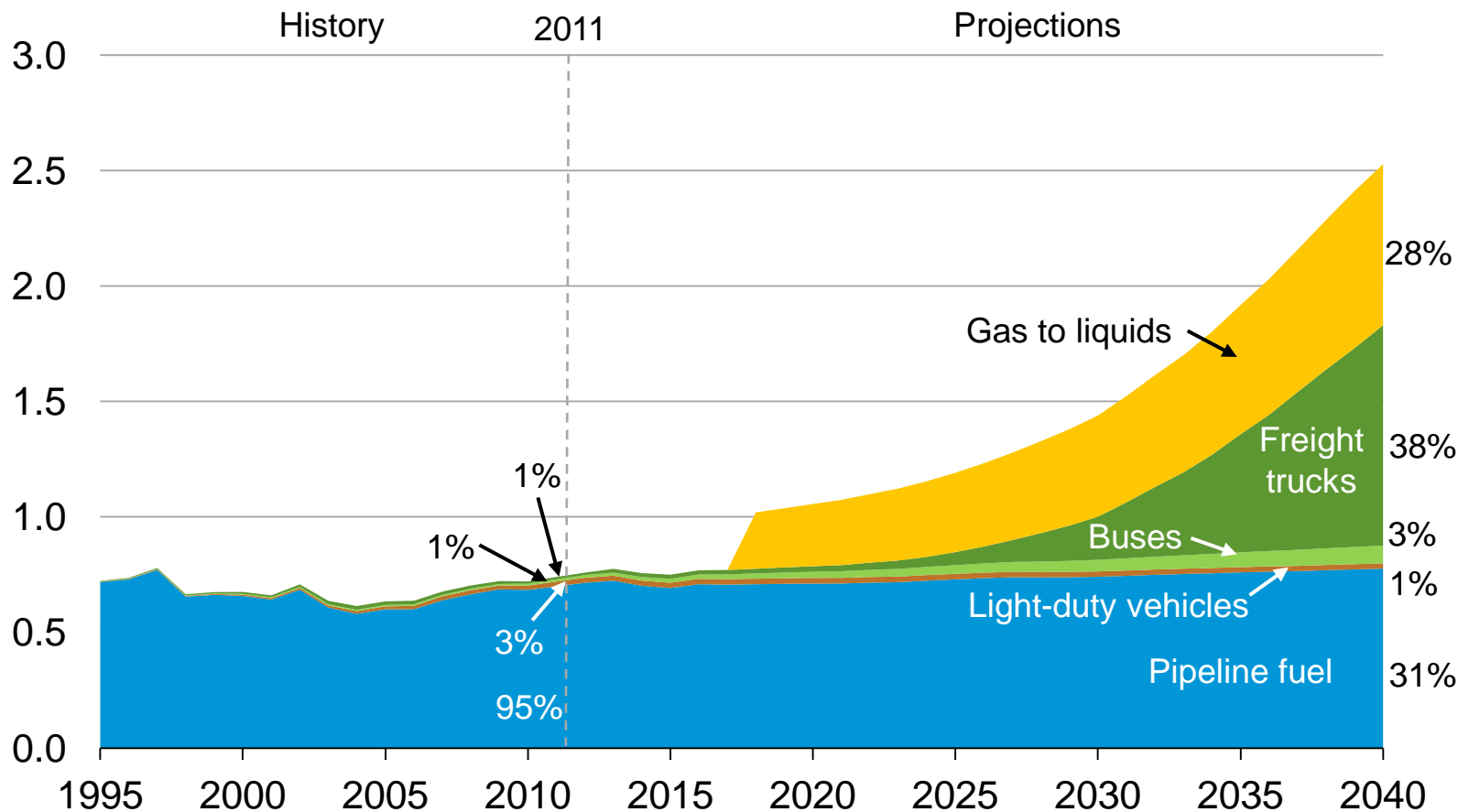
Note: Gas to liquids includes heat, power, and losses.

Source: EIA, Annual Energy Outlook 2013 Early Release

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

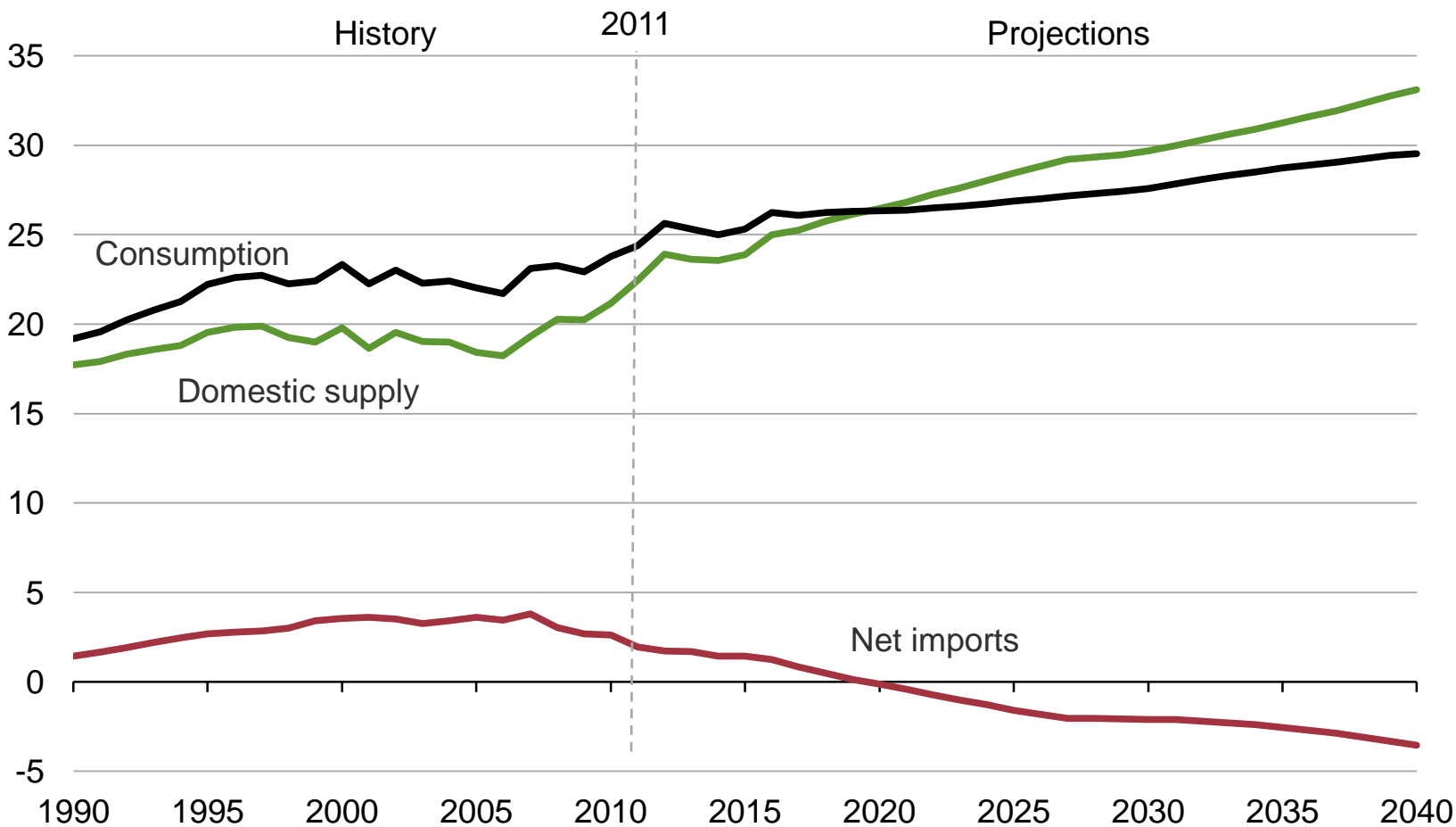U.S. natural gas exports
trillion cubic feet

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
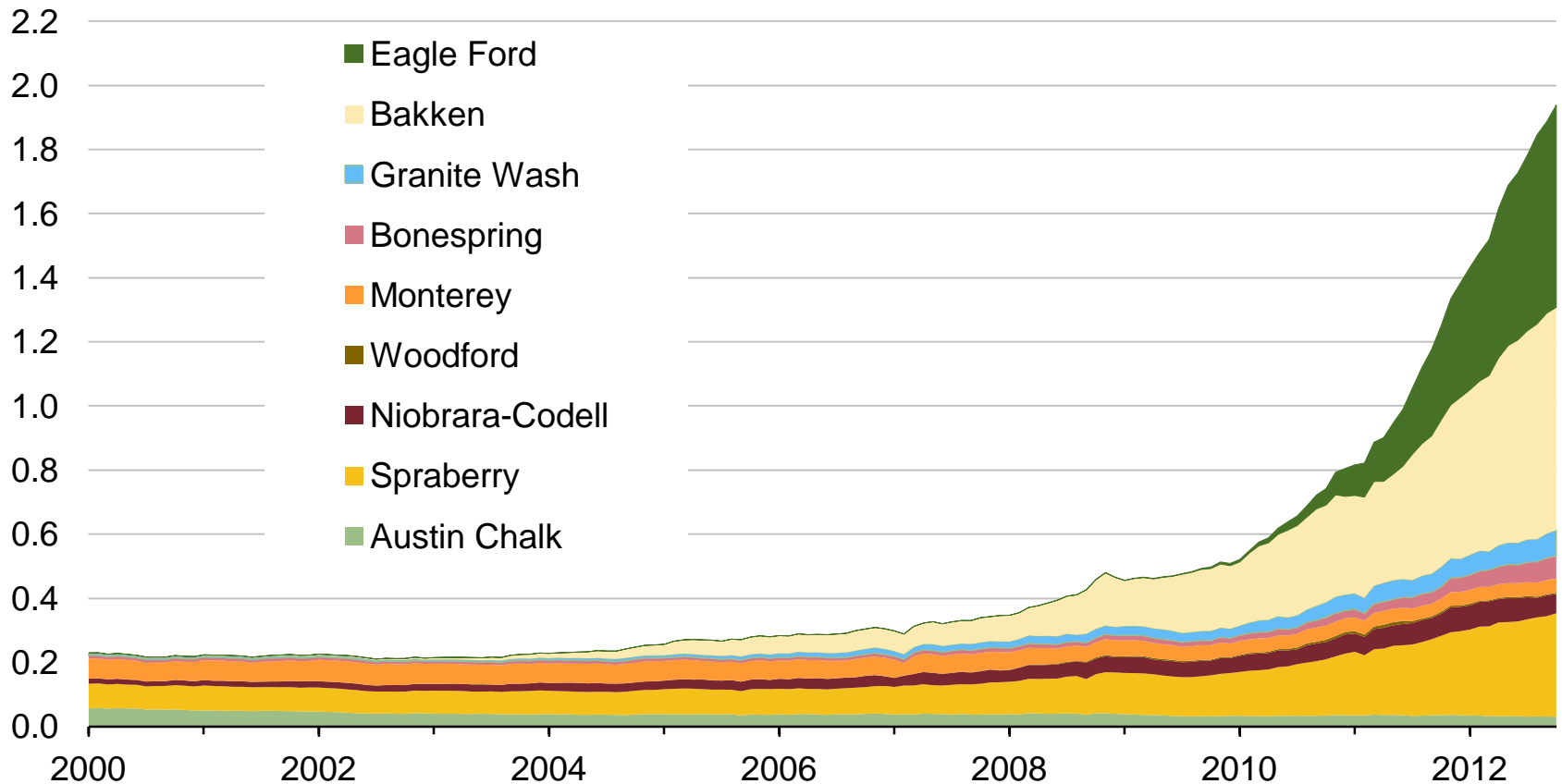
U.S. dry gas
trillion cubic feet

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

tight oil production for select plays
million barrels per day

Legend:
- Eagle Ford
- Bakken
- Granite Wash
- Bonespring
- Monterey
- Woodford
- Niobrara-Codell
- Spraberry
- Austin Chalk

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

U.S. crude oil production
million barrels per day
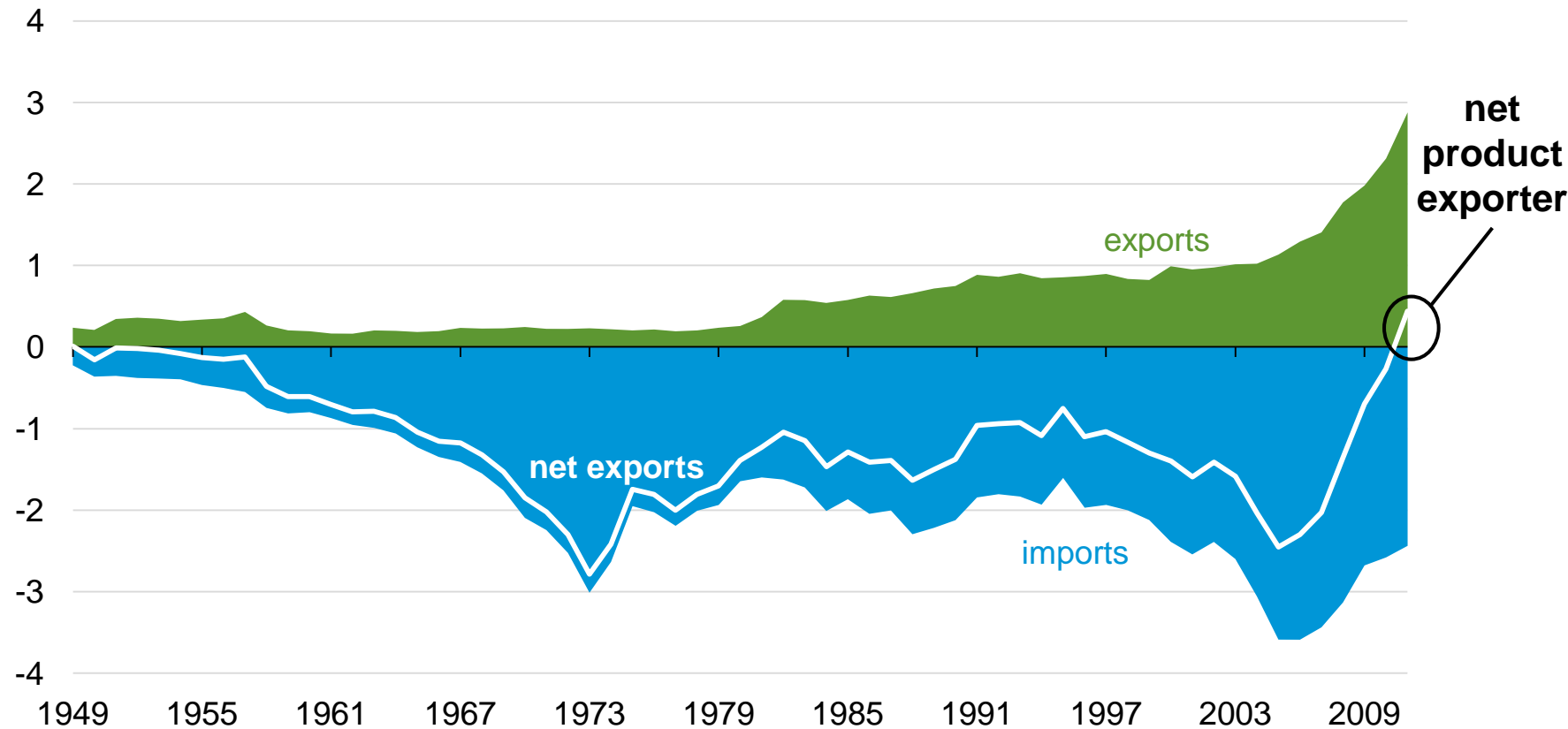
History   2011   Projections

STEO Feb. 2013 U.S. crude oil projection

Tight oil

Other lower 48 onshore

Lower 48 offshore

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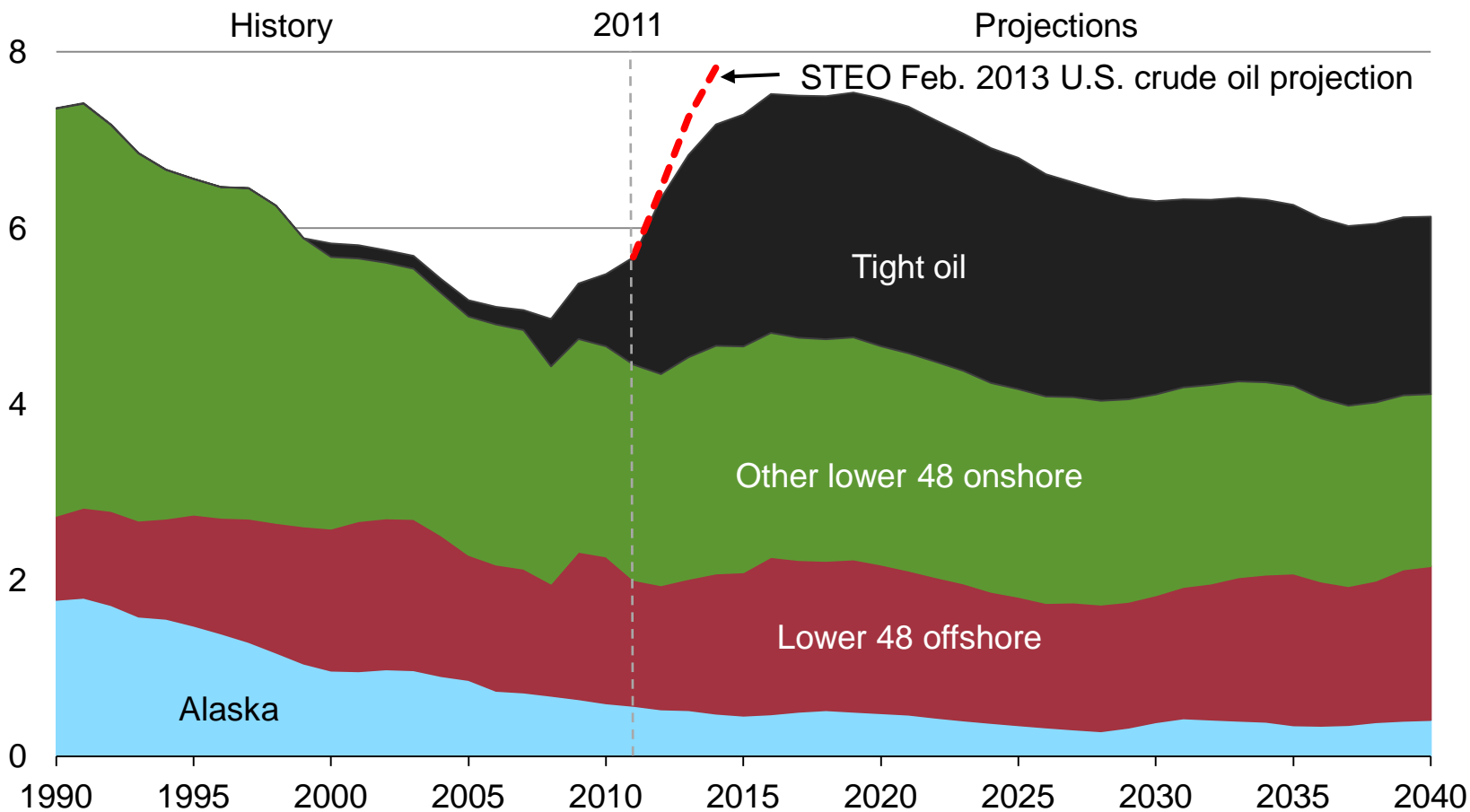
Source: EIA, Annual Energy Outlook 2013 Early Release and Short-Term Energy Outlook, February 2013

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

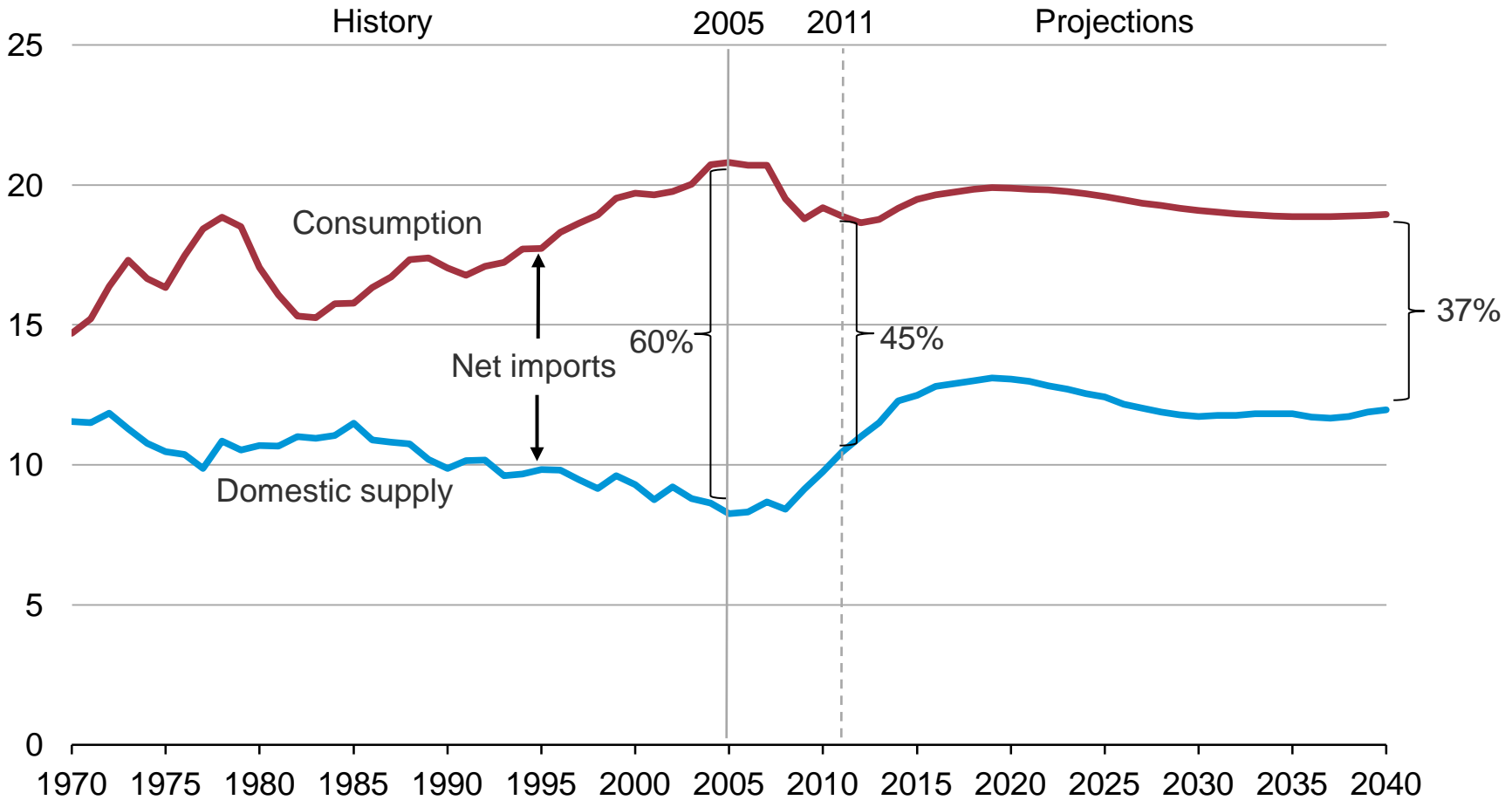annual U.S. net exports of total petroleum products, 1949 – 2011
million barrels per day

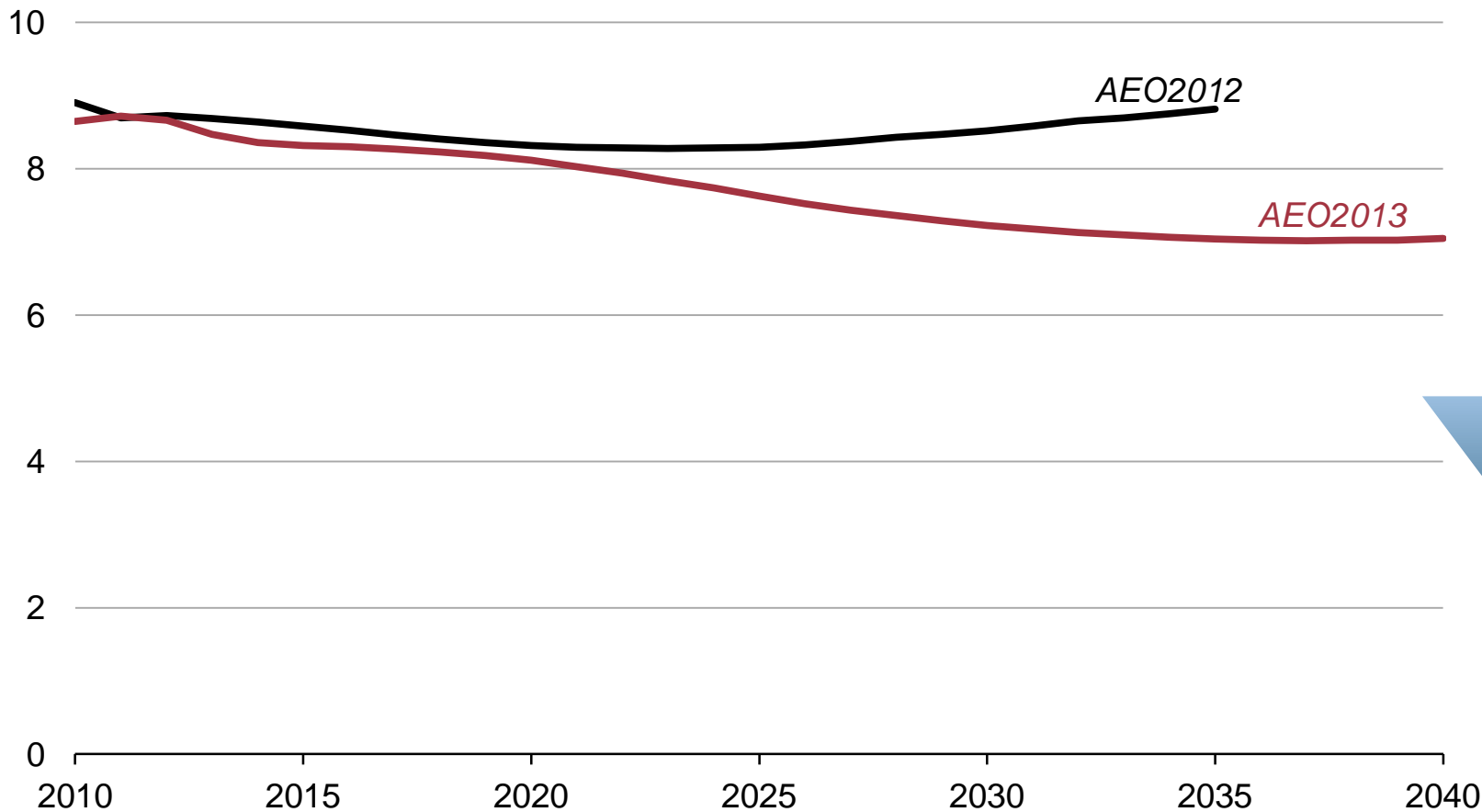# U.S. dependence on imported liquids depends on both supply and demand

U.S. liquid fuel supply
million barrels per day

Source: EIA, Annual Energy Outlook 2013 Early Release

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

light-duty vehicle liquids consumption
million barrels per day

Adam Sieminski, Energy Council
March 09, 2013

Global tight oil production comparisons

IEO2013 DRAFT

million barrels per day

Legend:
- Australia
- China
- Russia
- Argentina
- Mexico
- Canada
- United States

BP Energy Outlook 2030

Mb/d

Legend:
- China
- Russia
- S. America
- N. America

% of total (RHS)
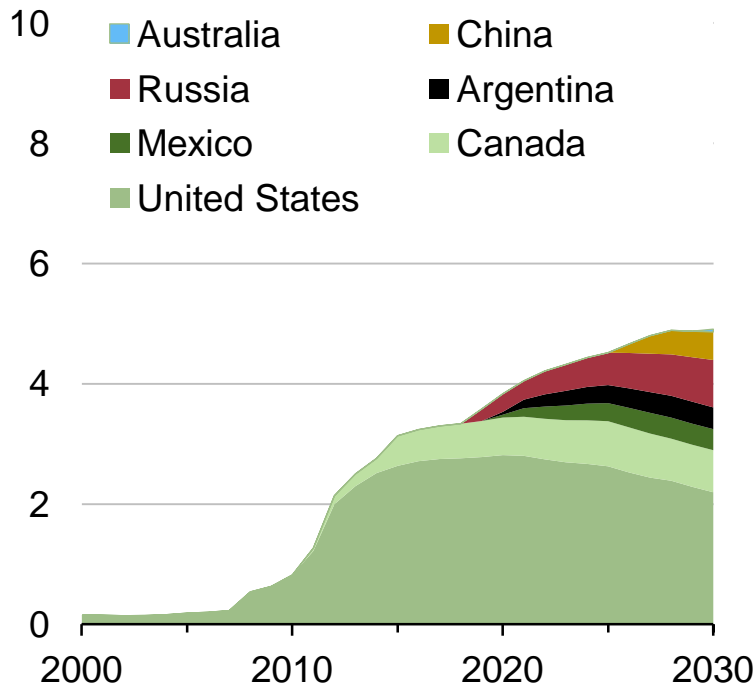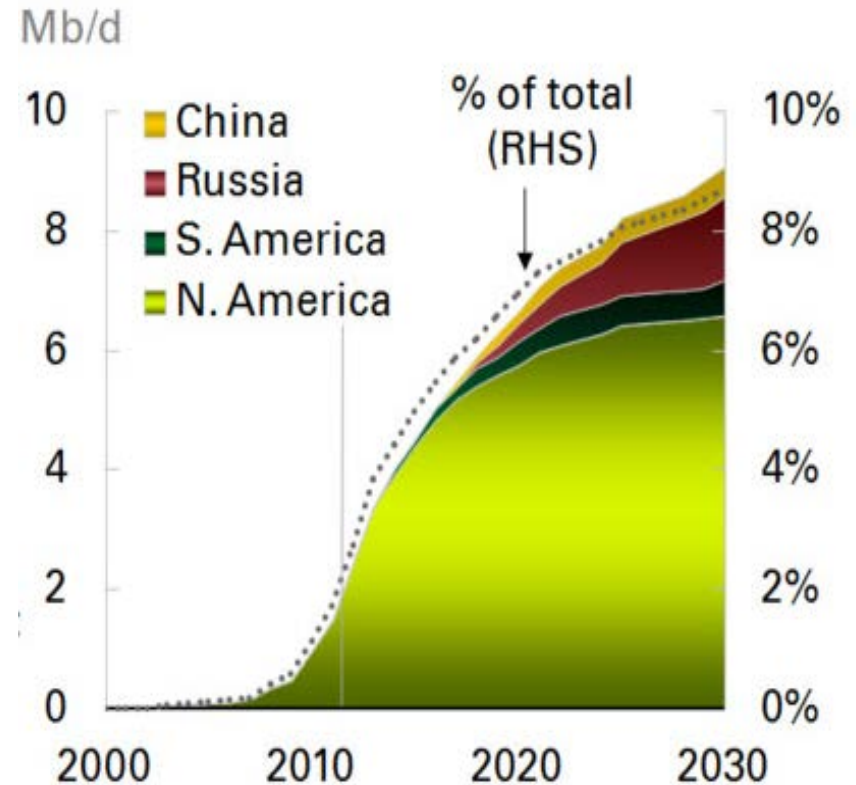
Source: Preliminary International Energy Outlook 2013, BP Energy Outlook 2030

EIA Data & the Importance of Cooperation with the States

Groundwater Protection Council (GWPC)

- The Ground Water Protection Council (GWPC) consists of state ground water regulatory agencies (spun out of the IOGCC)

- The purpose is to promote and ensure the use of best management practices and fair but effective laws regarding comprehensive ground water protection

- FracFocus Website – FracFocus is the national hydraulic fracturing chemical registry and is managed by the GWPC and Interstate Oil and Gas Compact Commission (IOGCC)

Risked Based Data Management System (RBDMS)

- More than 22 regulatory agencies use the RBDMS data management system for tracking oil, gas, injection well and water protection activities

- Since 1992, development of RBDMS software underwritten through grants from the DOE. Funding has also been provided by state agencies including in-kind services

- Provides access to data for well history, tracking ownership, bonding, permitting, location, construction, inspection, production, and plugging/ restoration, and compliance

- RBDMS development is directed by the Technical Committee, a users' group whose participation is drawn from multiple states

Oil and gas wells drilled in 2012 and RBDMS partners

Wells Drilled in 2012

■	200 to 718	(32)
■	150 to 200	(12)
■	100 to 150	(18)
■	50 to 100	(38)
■	10 to 50	(159)
■	0 to 10	(368)

★ **State partner**
★ **Non-state partner**
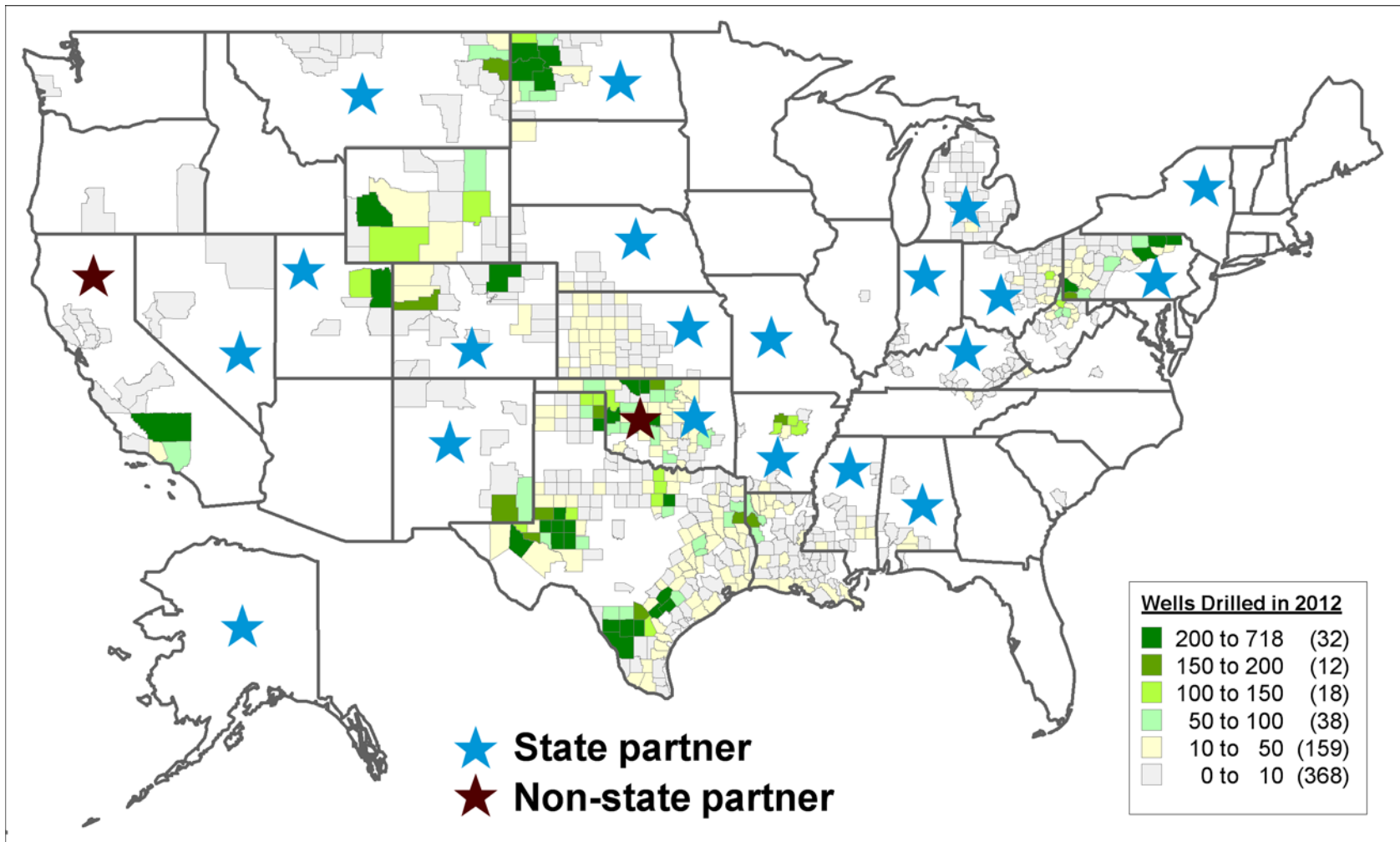
Currently talking to TX, CA, LA, and WV

Objectives of EIA-GWPC partnership

- Increase public availability of timely, accurate, and comprehensive U.S. oil and gas production data

- Continually strive to meet emerging data needs such as current need for shale production data

- Provide timely analyses of oil and gas production trends through geospatial analysis

- Collaborate with RBDMS partners to develop tailored data systems

EIA – GWPC/RBDMS Working Together to Improve Oil/Gas Data Availability and Quality

- Phase 1: Central data repository consisting of the latest available data from each RBDMS state

  - pilot project, proof of concept for 4 states underway now

  - future expansion to all 22 states

  - data not as timely as EIA-914 expansion but will be used for EIA-914 QA

- Phase 2: Improved data collection

  - establish common/standard data definitions/translation across states

  - improve QA processes

  - expand number of states

  - provide more timely analyses of oil/gas production using geospatial analysis and other GWPC/RBDMS data

Annual natural gas well starts and natural gas production in Pennsylvania
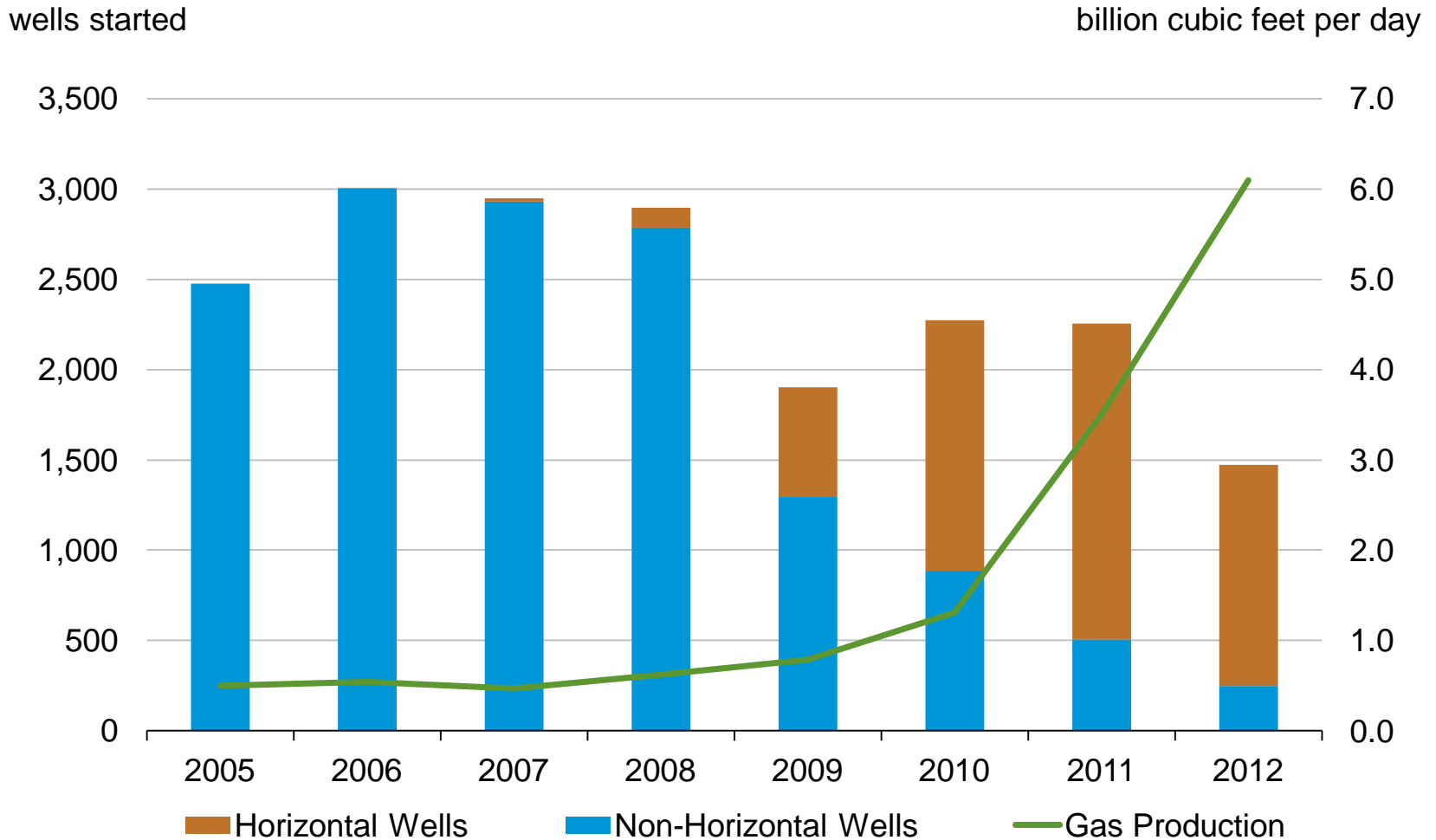
Source: Pennsylvania Department of Environmental Protection

North Dakota's oil/gas information model

- ND Dept of Mineral Resources provides timely, complete and reliable oil and gas data and information

- Data collection – streamlined and automated
  - electronic only
  - advanced edit procedures applied
  - collection at multiple points provides checks and balances and ensures consistency
  - enforcement provides for timely responses from respondents

- Data reporting – timely and accurate
  - monthly data published 45 days after end of the month
  - few/minor revisions to data
  - public accessibility: comprehensive data posted on internet site
  - continuous process and reporting improvement expand the public's understanding of oil/gas developments in the state
  - interactive GIS map server available to public with well level and field level data

Why EIA matters to you

- Data from all states in one location: comparisons/rankings/maps

- Data-mining to routine monthly data retrievals

- Context and perspective: short and longer term outlooks

- Webinars, workshops, conferences

- *Energy Explained* and *Energy Kids*

My Challenge as Administrator:
Improving the quality, timeliness and accessibility of EIA information – data, analysis and outlooks
Building on data information management systems like RBDMS could be a way for all of us to benefit

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