Energy Markets

for

The Payne Institute for Earth Resources at the Colorado School of Mines

October 29, 2015 | Golden, Colorado

by

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U.S. Energy Information Administration

Independent Statistics & Analysis
U.S. Energy Information Administration

Mandate: 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

Independence: EIA, an element of the Department of Energy, is one of 14 federal statistical agencies; by law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government

Mission: EIA provides data and analysis to help stakeholders understand the rapidly changing energy landscape across all fuels and all sectors

EIA information is used by a range of stakeholders

Source: 2015 EIA Web Customer Survey

Examples of Activities

Government
- Executive Agencies use EIA data to track energy markets, and program performance, and to analyze policy proposals
- Congress – policy development and agency funding
- State Governments – planning and program development

Energy Sector
- Consumers – monitor price forecasts
- Producers – track inventory statistics

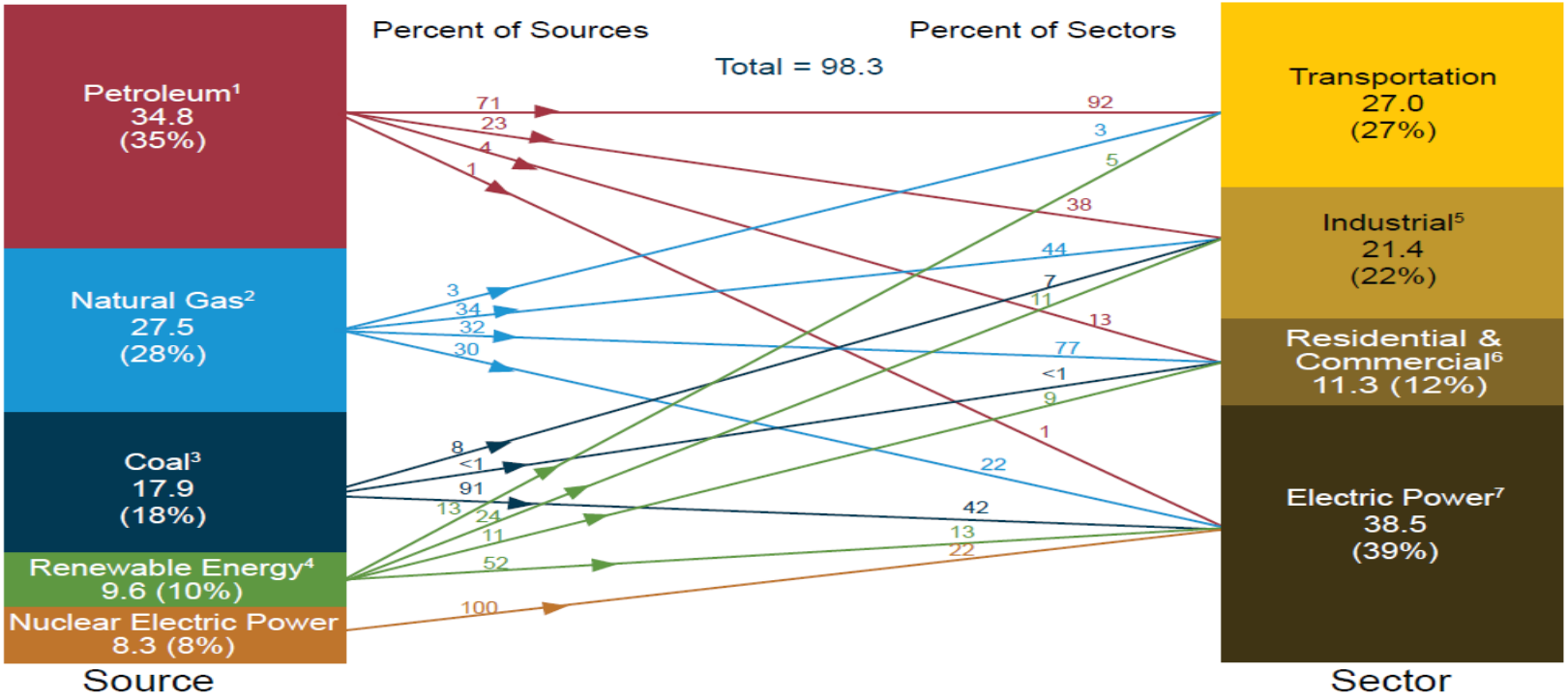
Business/Industry
- Manufacturers – market research

Finance/Consulting
- Commodities Analysts – market response to supply data

Media/Education
- Journalists – cite energy statistics
- Teachers – use Energy Kids materials
- Researchers – energy forecasting and modeling

Private Citizens
- Public – research gasoline prices

2014 U.S. primary energy use by source and sector
quadrillion British thermal units

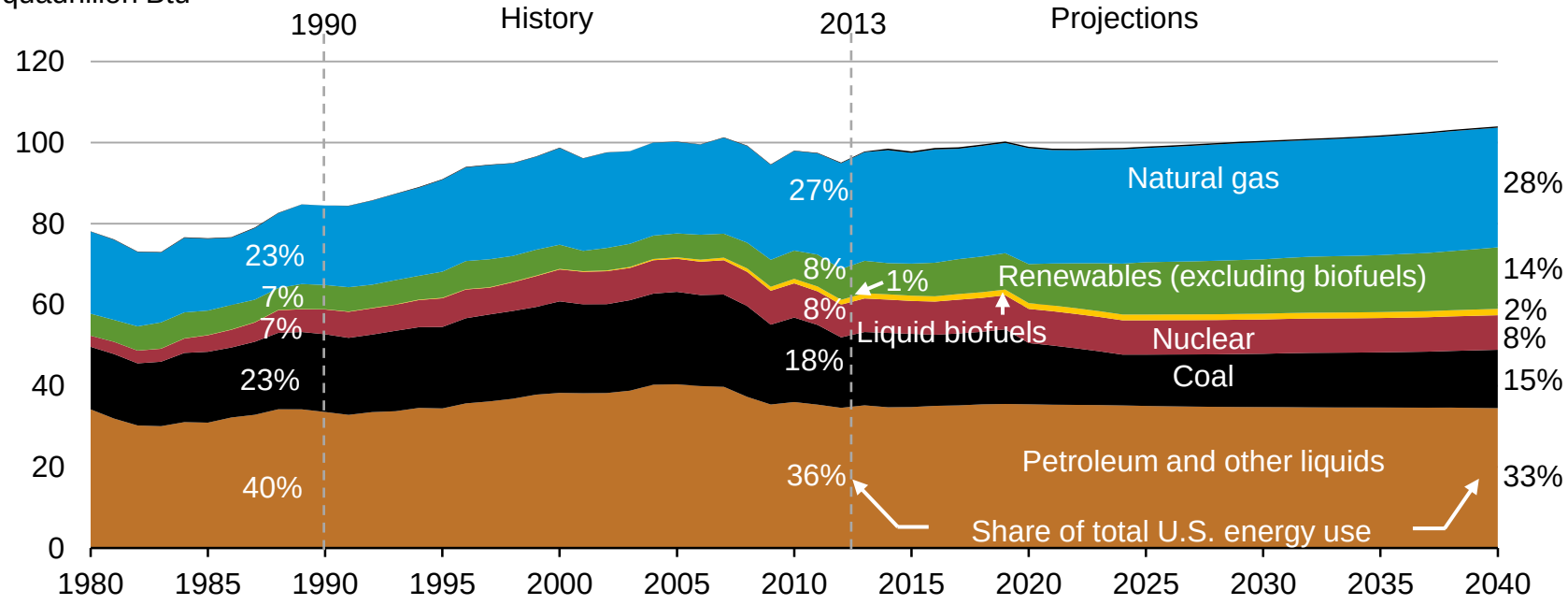


Source: EIA, Monthly Energy Review

U.S. energy use grows slowly over the projection reflecting both economic recovery and energy efficiency improvement

U.S. primary energy consumption

quadrillion Btu



Source: EIA, Analysis of the Impacts of the Clean Power Plan (May 2015), Base Policy case

Key results from the *2015 Annual Energy Outlook* (current laws and policies + *proposed* Clean Power Plan)

- Growing domestic production of natural gas and oil continues to reshape the U.S. energy economy
- Light-duty vehicle energy use declines sharply reflecting slowing growth in vehicle miles traveled and accelerated improvement in vehicle efficiency
- With continued growth in shale gas production, natural gas becomes the largest source of U.S. electric power generation, surpassing coal within 5 to 10 years, and boosting production and natural gas consumption in manufacturing
- Strong growth in domestic natural gas production supports increased exports of both pipeline and liquefied natural gas
- With strong growth in domestic oil and gas production, U.S. dependence on imported fuels falls sharply
- Improved efficiency of energy use and a shift away from carbon-intensive fuels keep U.S. energy-related carbon dioxide emissions below their 2005 level through 2040, even before consideration of the recently finalized Clean Power Plan

Key questions regarding the U.S. energy outlook

- Which path best characterizes U.S. hydrocarbon production growth over the next 5 to 10 years? How is the path influenced by prices, resources, and technology?

- What is the impact of possible relaxation of limitations on oil and natural gas exports for production growth and markets ?

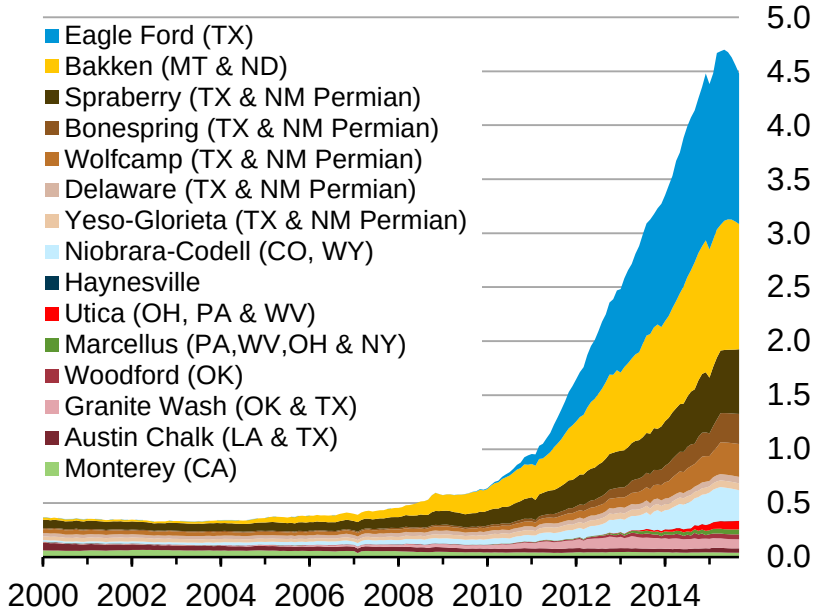
- Will EPA's final rules for existing coal fired power plants be delayed by political or legal challenges, and how will states implement them?

Shale oil and gas

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

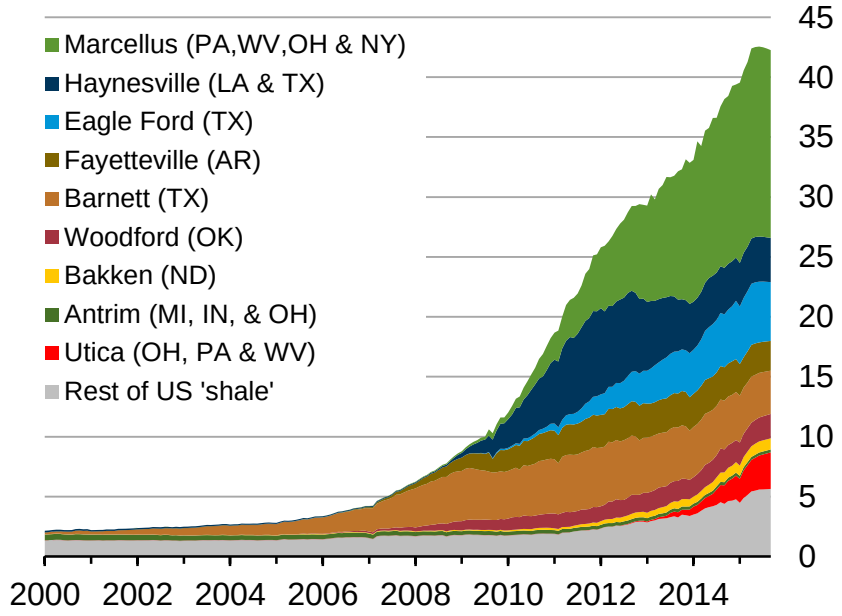
U.S. tight oil production

million barrels of oil per day



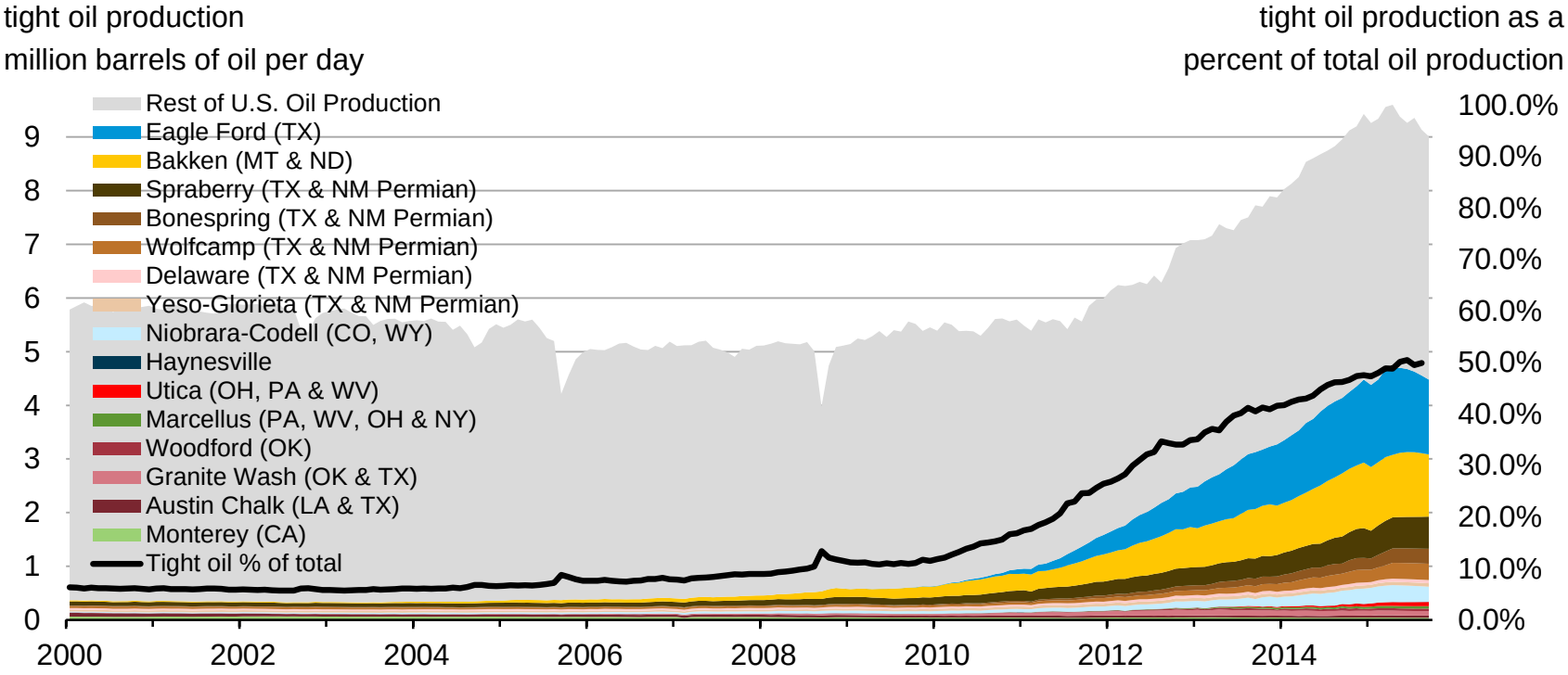
U.S. dry shale gas production

billion cubic feet per day



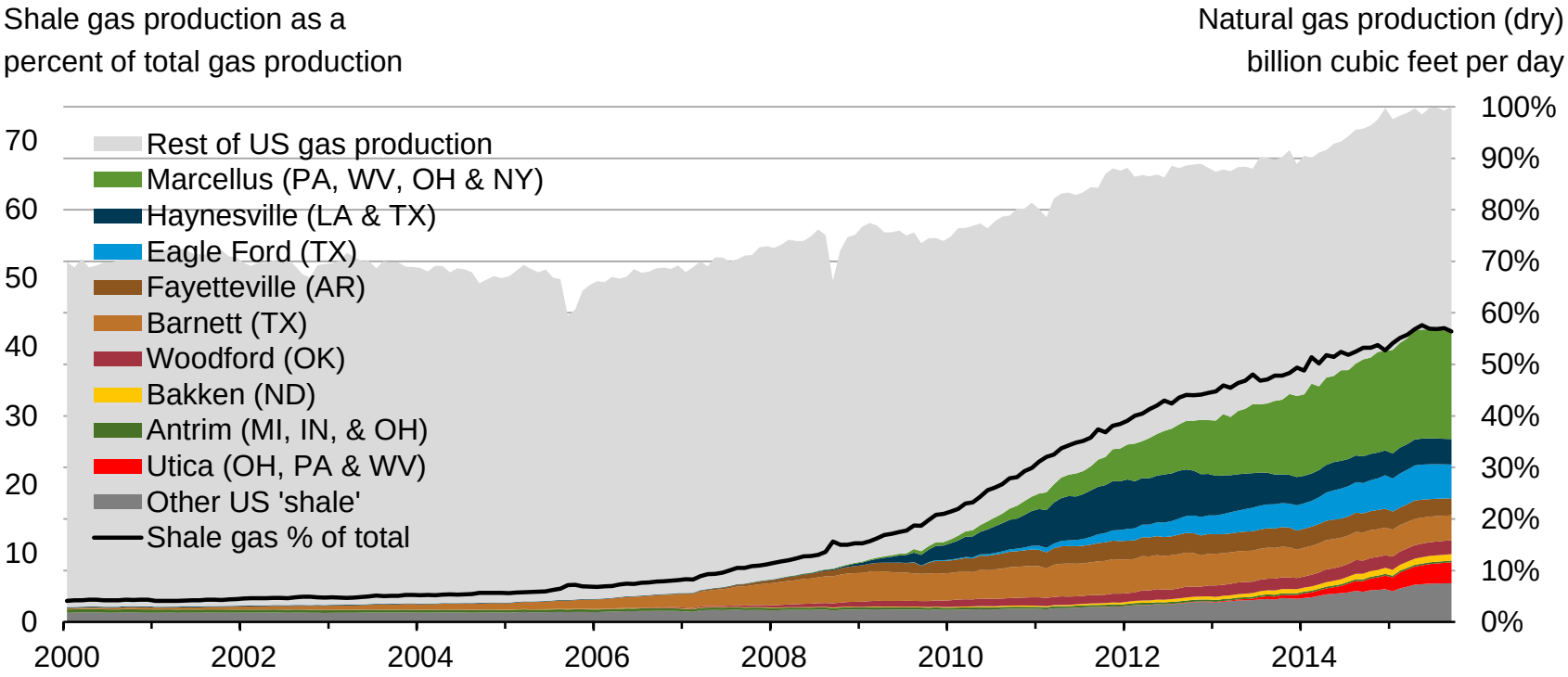
Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through September 2015 and represent EIA's official tight oil & shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).

Estimated U.S. tight oil production was 4.5 MMbbl/d in September 2015 about 50% of total U.S. oil production (9.0 MMbbl/d)



Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through September 2015 and represent EIA's official tight oil estimates, but are not survey data. State abbreviations indicate primary state(s).

Estimated U.S. shale gas production was 42.3 Bcf/d in September 2015 about 56% of total U.S. dry production (74.9 Bcf/d)

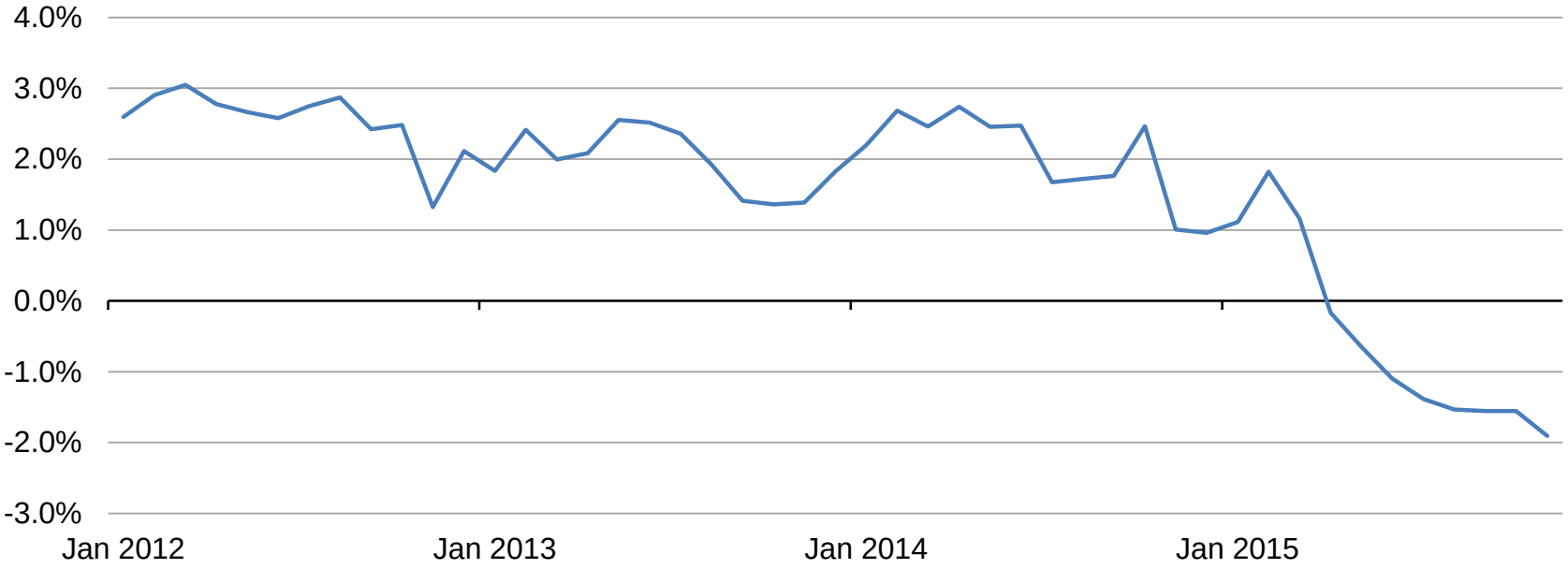


Sources: EIA Natural Gas Monthly data through December, STEO through September 2015 and Drilling Info.

Production growth in top crude producing regions (Permian, Bakken, Niobrara, and Eagle Ford) reverses in early 2015

monthly percent change

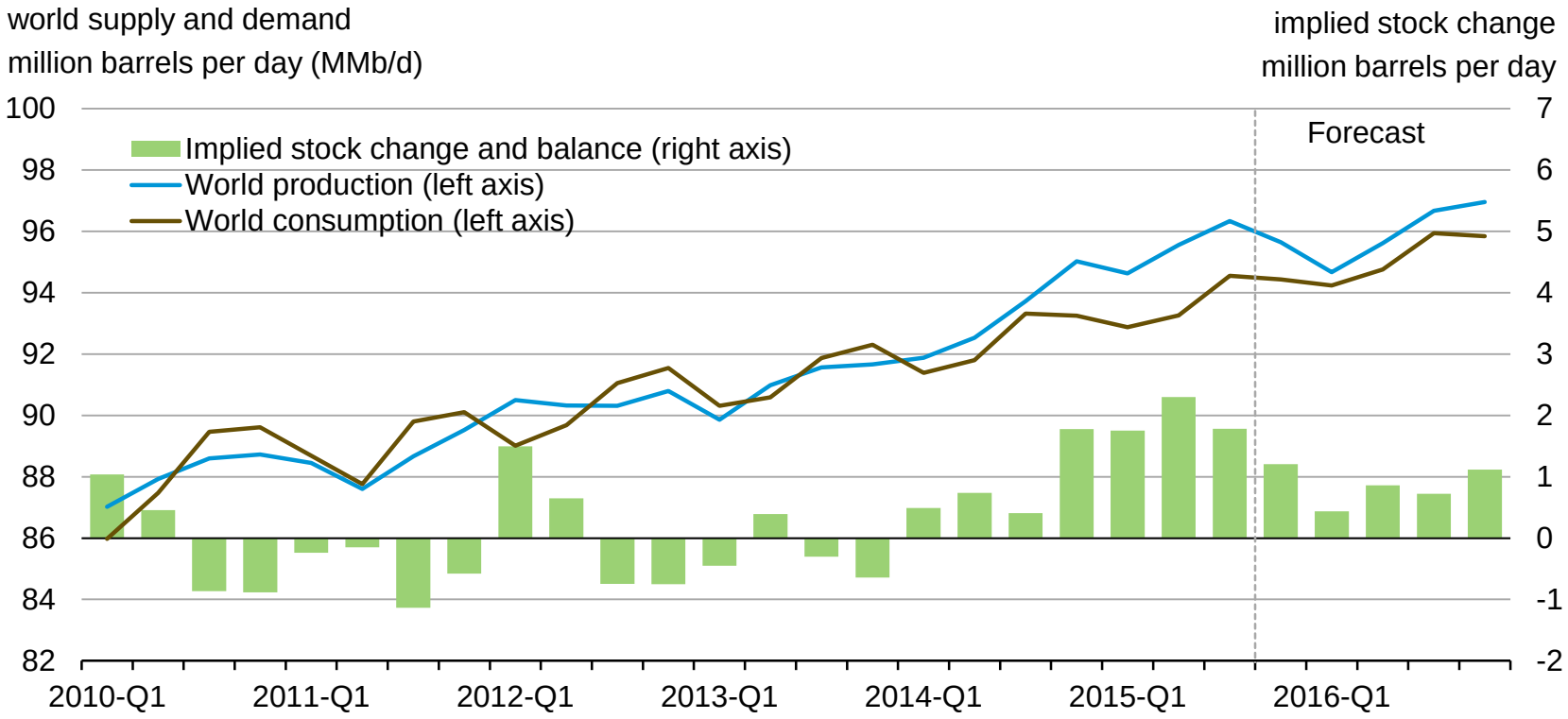
three month rolling average



Source: EIA, Drilling Productivity Report, October 2015 (chart extends to November 2015)

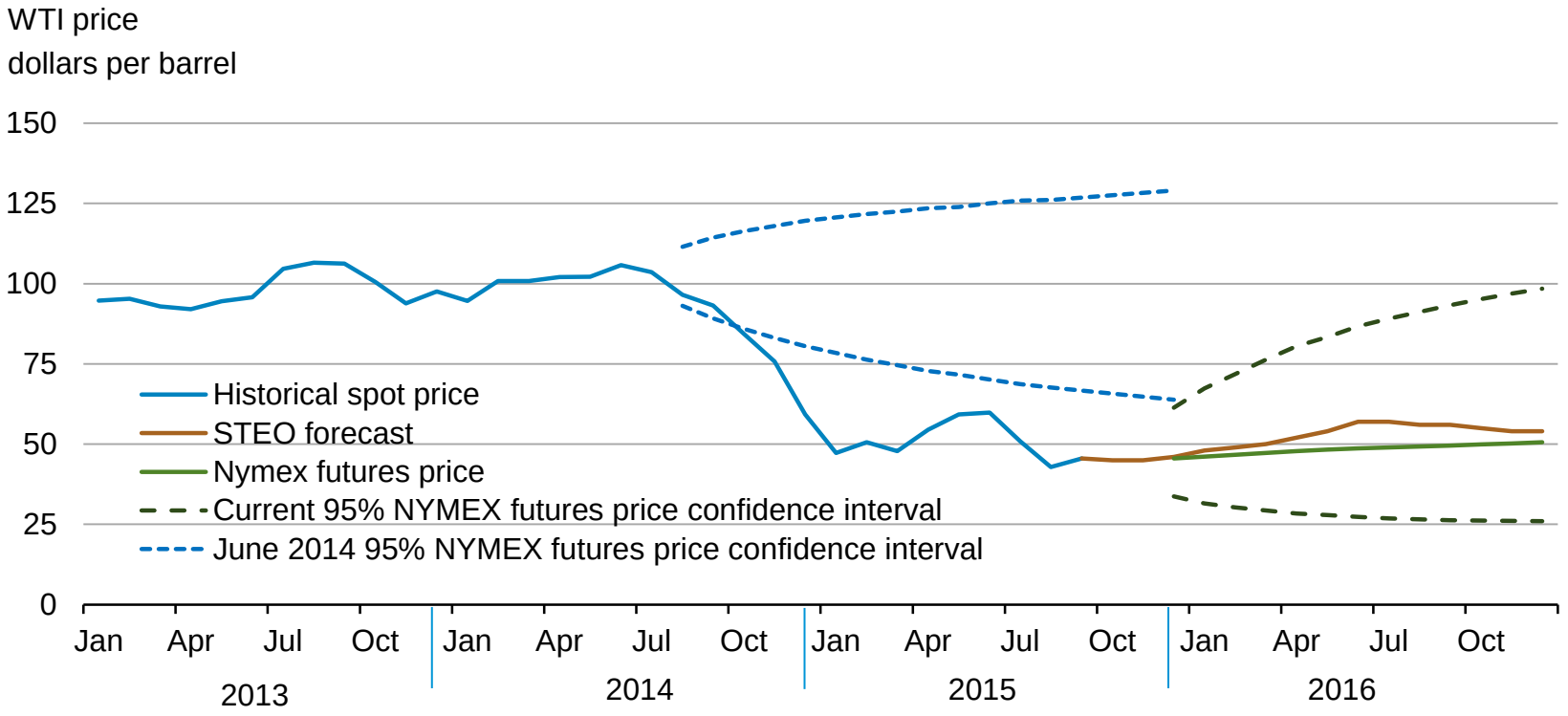
Oil markets

Oil supply and demand begin to rebalance in 2016



Source: EIA, Short-Term Energy Outlook (October 2015)

The market-implied confidence band for oil prices is very wide

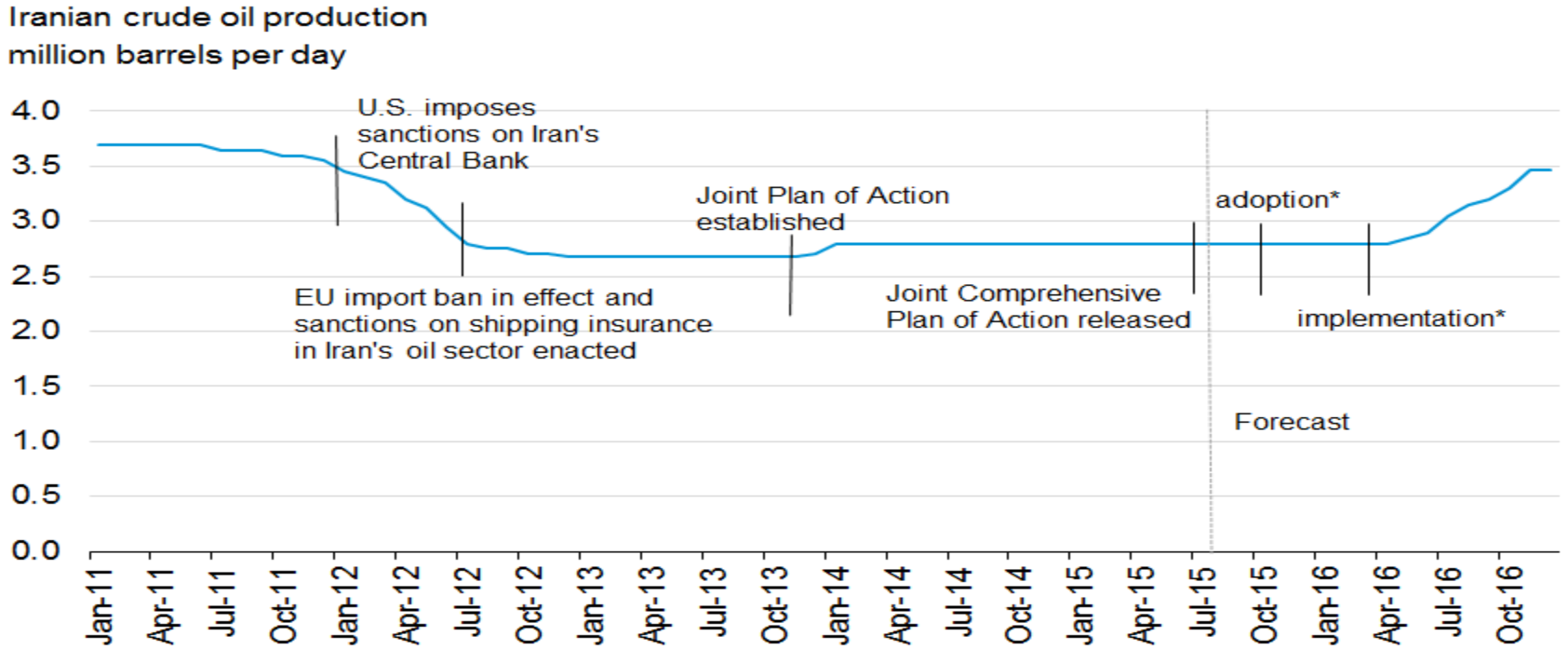


Source: EIA, Short-Term Energy Outlook (October 2015)

Oil demand: Prices and economic growth are important, but policy, preferences, and technology may have a bigger long-term impact

- What types of consumption and pricing policies will be enacted across the world?
  - Fuel subsidies
  - Environmental policies
  - Domestic security policies
- What will light-duty vehicle trends look like?
  - Ownership rates
  - Efficiency and emissions standards
  - Technology/alternative fuels
- Where will goods be produced and how will they be moved?
- Will there be major industrial sector efficiency improvements or fuel switching?

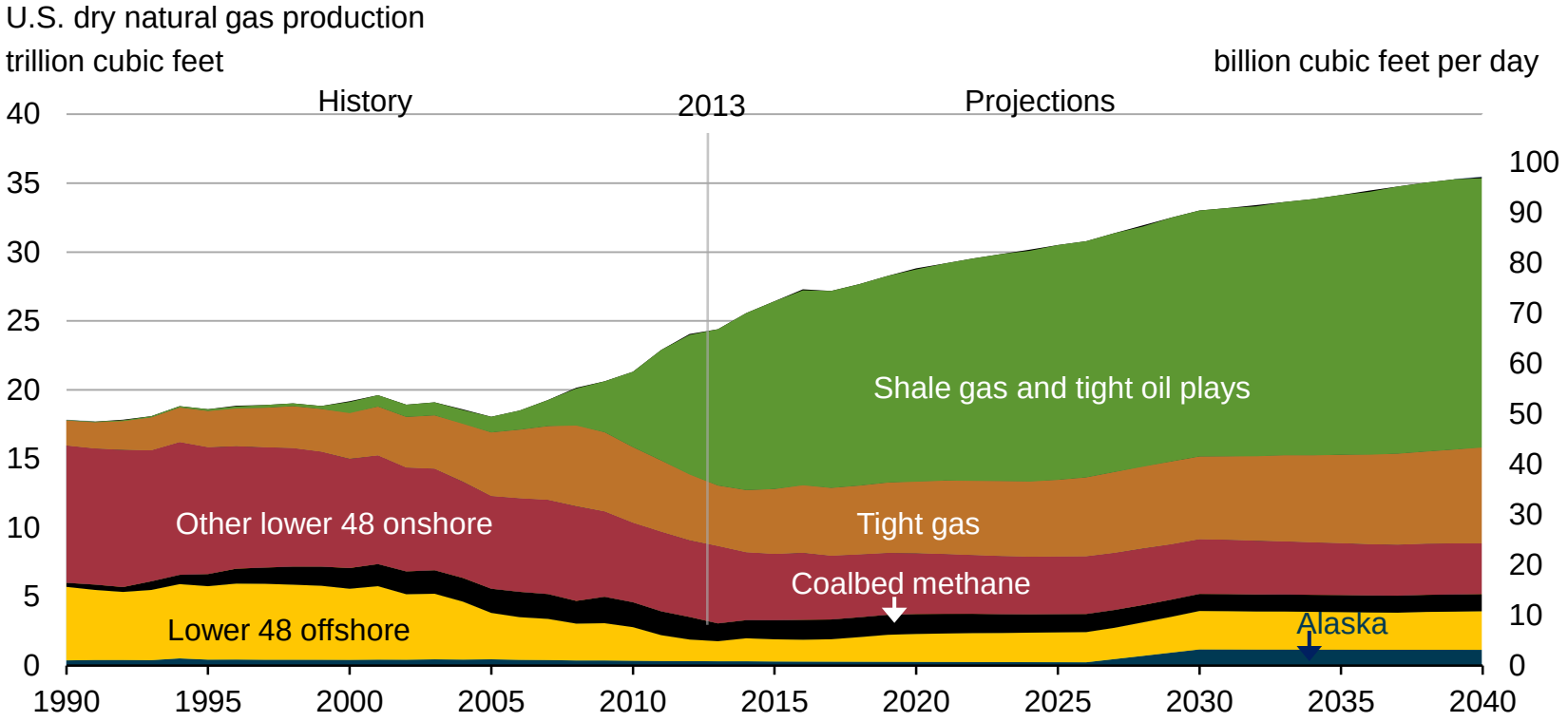
Iranian crude oil production is expected to begin increasing in the 2Q 2016, inventory sales could be sooner



Source: Energy Information Administration
**EIA's assessment*

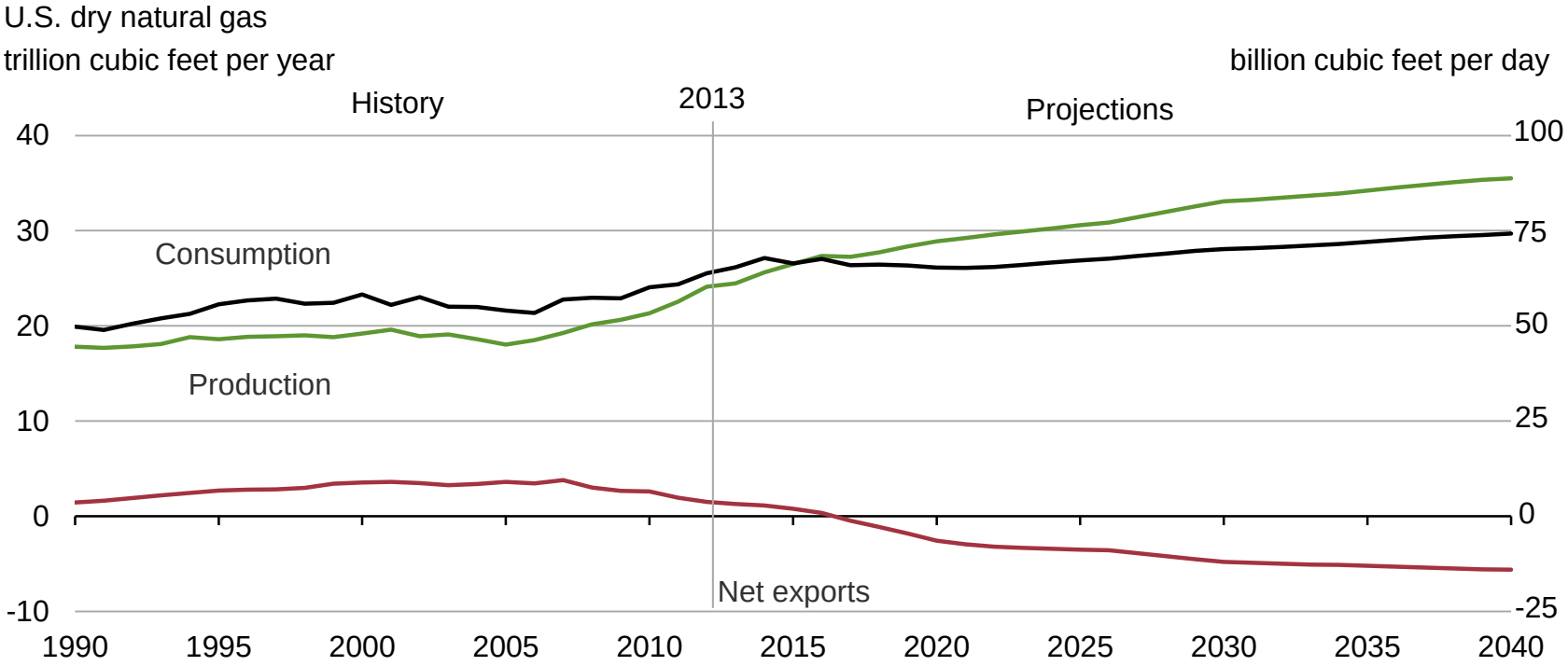
Natural gas markets

Shale resources remain the dominant source of U.S. natural gas production growth



Source: EIA, Annual Energy Outlook 2015 Reference case

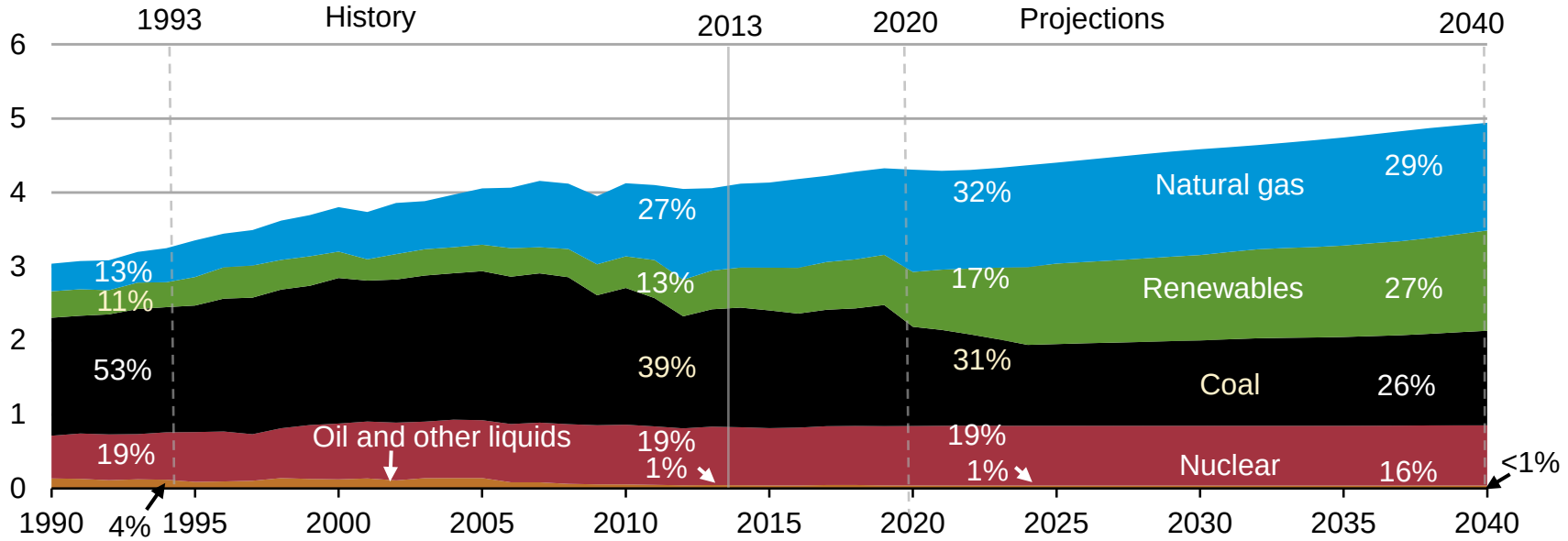
U.S. becomes a net exporter of natural gas in the near future



Source: EIA, Annual Energy Outlook 2015

With the proposed Clean Power Plan, the electricity mix shifts to lower-carbon options, led initially by growth in natural gas and later by renewables generation

electricity net generation
trillion kilowatthours per year

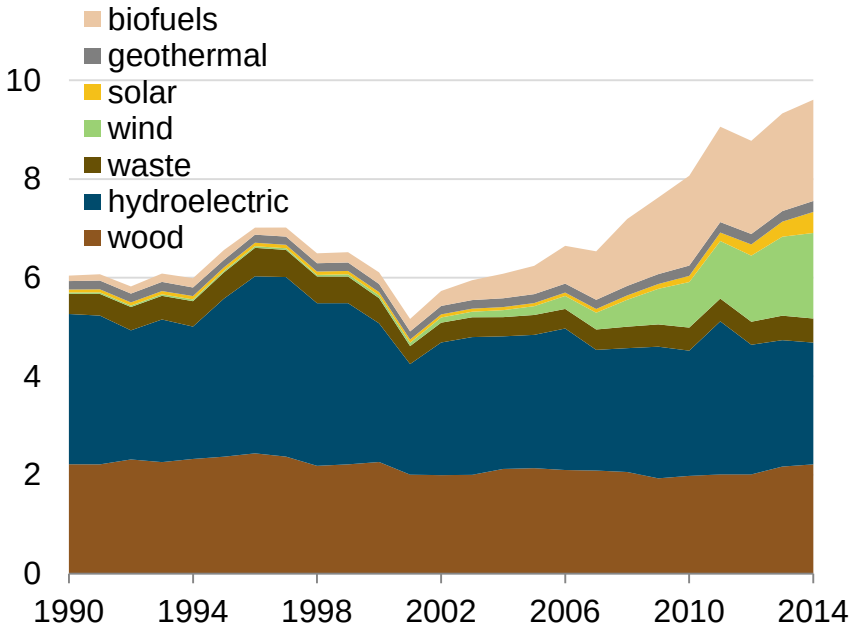


Source: EIA, Analysis of the Impacts of the Clean Power Plan (May 2015), Base Policy case

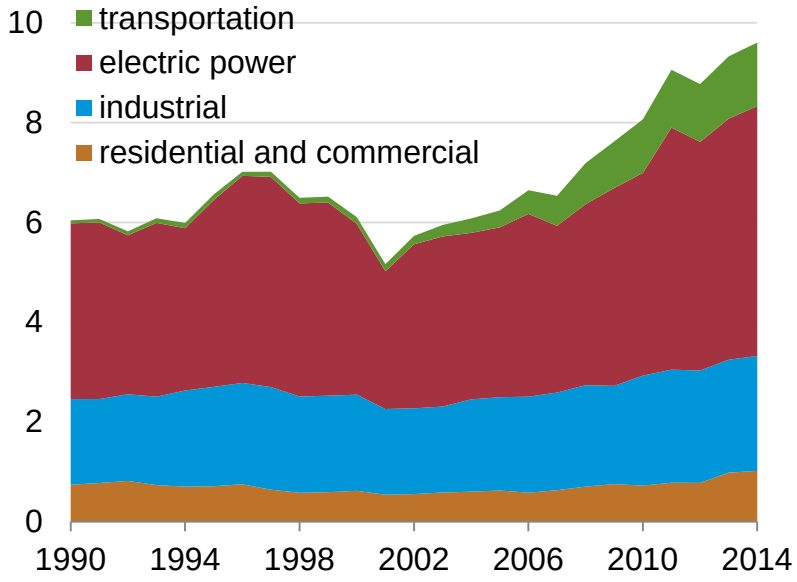
Renewable energy

U.S. renewable energy consumption, 1990 – 2014 by source and by sector

U.S. renewable energy consumption by source
quadrillion British thermal units (Btu)



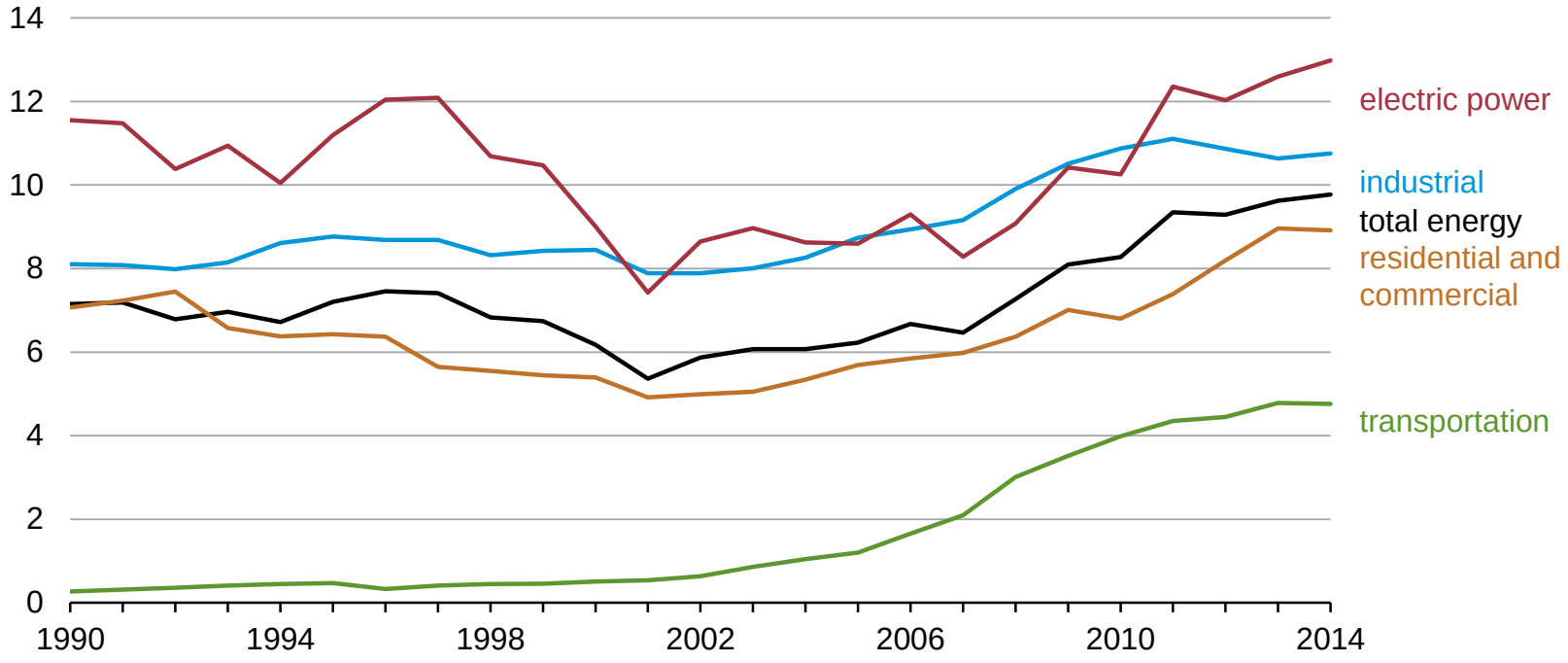
U.S. renewable energy consumption by sector
quadrillion British thermal units (Btu)



Source: U.S. Energy Information Administration, Monthly Energy Review (April, 2015)

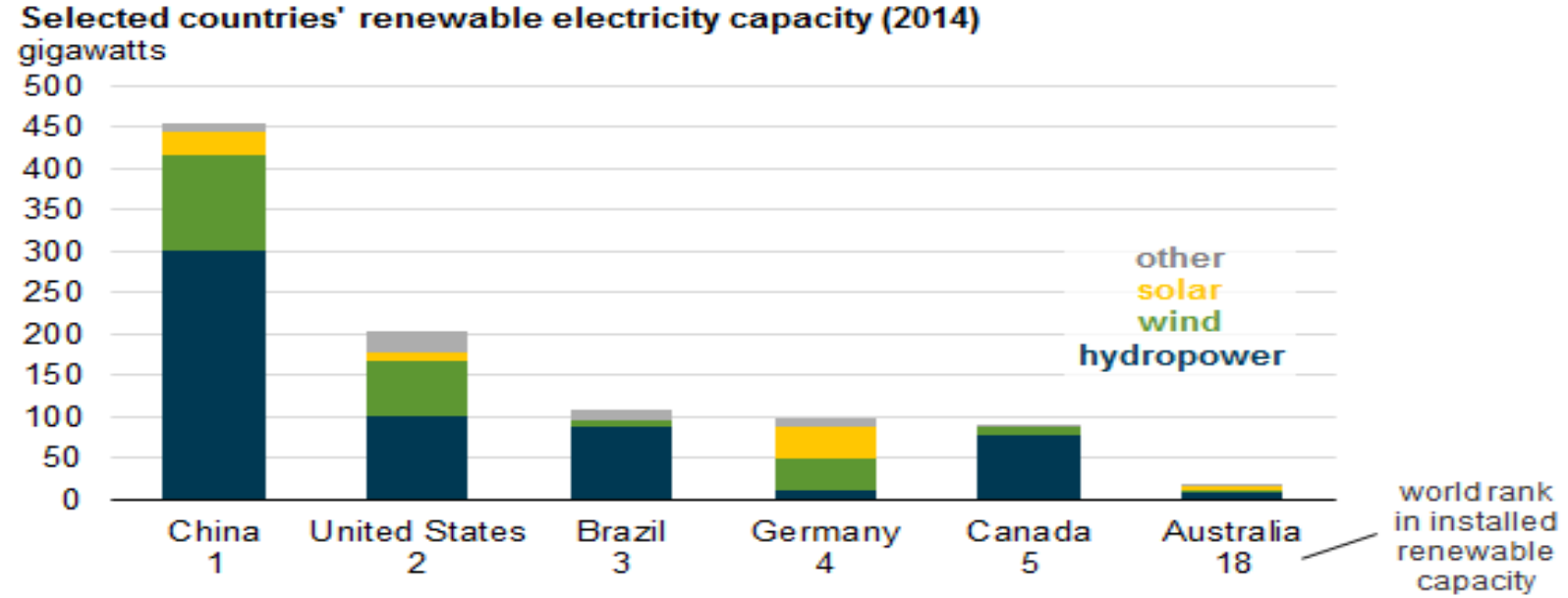
Renewables share of U.S. energy consumption highest since 1930s

renewable share of U.S. energy consumption, total and by sector
percent



Source: U.S. Energy Information Administration, Monthly Energy Review (April 2015)

Leading producers of renewable electricity

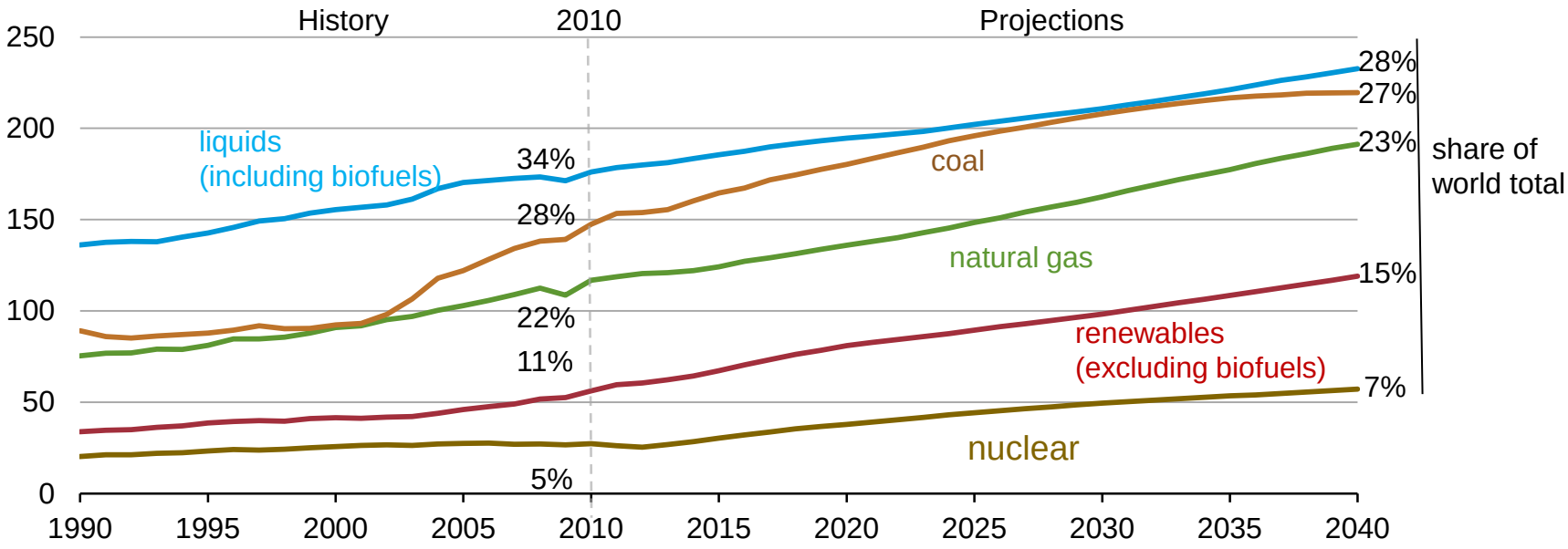


Source: International Renewable Energy Agency

Climate considerations

Renewable energy and nuclear power are the fastest growing source of energy consumption

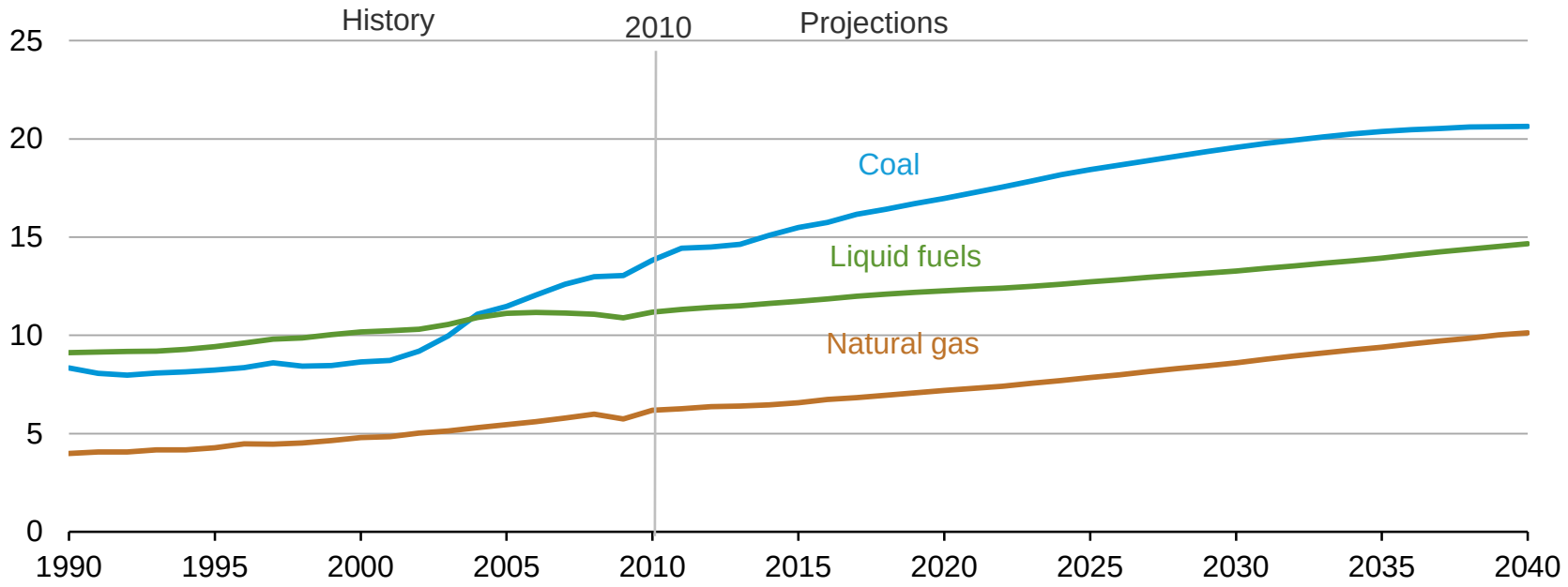
world energy consumption by fuel
quadrillion Btu



Source: EIA, International Energy Outlook 2013

World energy-related carbon dioxide emissions continue to grow in IEO2013 assuming then-current policies; IEO2015 will show a lower growth trajectory

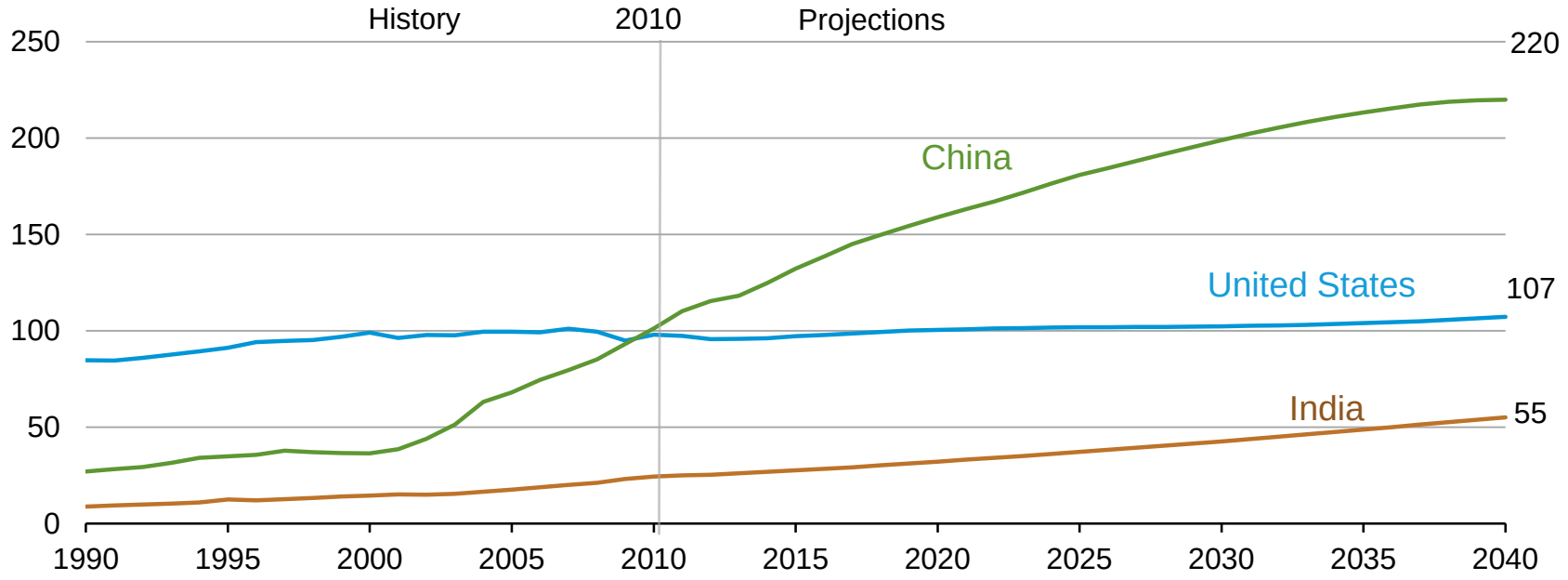
carbon dioxide emissions
billion metric tons



Source: EIA, International Energy Outlook 2013

By 2040, China's projected energy use will be double the U.S. level; India's a little more than half despite its faster GDP growth

energy consumption by selected country
quadrillion Btu



Source: EIA, International Energy Outlook 2013

EIA has expanded the depth and breadth of its program, with more on the way

- International Energy Portal
- Monthly crude-by-rail data
- Analysis of the impacts of the Clean Power Plan
- Excel add-in tool for automatic data updates
- Report on federal subsidies in energy markets
- Ground Water Protection Council data collaboration
- Winter fuels prices for more states
- Domestic oil and gas production (EIA-914)
- Hourly electricity load data (EIA-930)
- Effects of Removing Restriction on U.S. Crude Oil Exports
- Coming soon
  - Drilling cost data
  - Distributed solar generation data and analysis
  - Integrating Customs and Border Protection exports data received on a more timely basis into EIA products

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/

International Energy Portal | www.eia.gov/beta/international/?src=home-b1