

# U.S. Tight Oil in Context

## *Overview of U.S. Tight Oil Production and Trends*



*For*

*Region 5 and Region 7 Regional Response Teams Meeting*

*April 22, 2015 | St. Charles, Missouri via video/teleconference*

*By*

*Grant Nülle, Upstream Oil & Gas Economist, Exploration and Production  
Analysis Team*



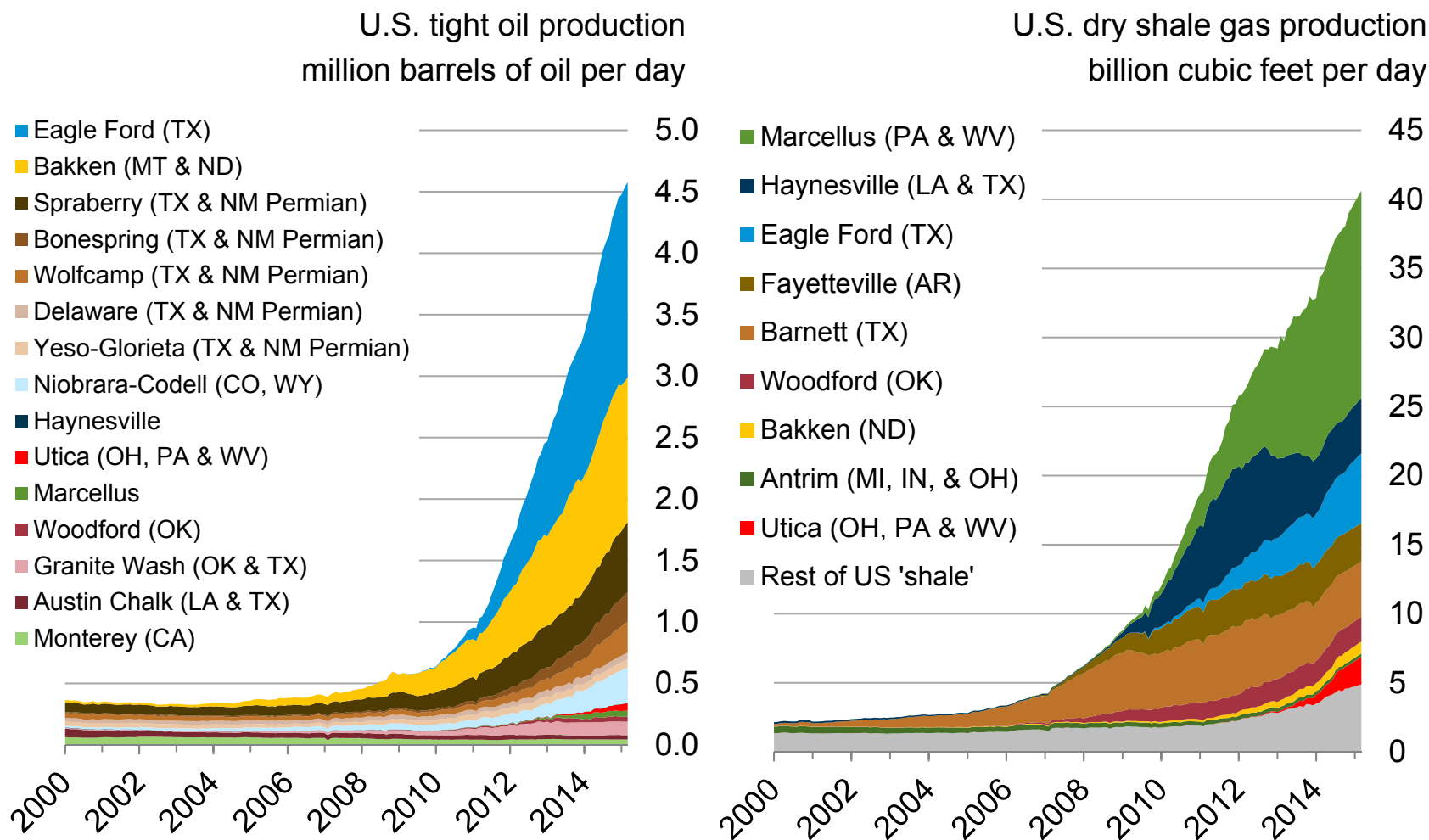
## EIA mission: independent statistics and analysis

- EIA was created by the U.S. Congress in 1977
- 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
- EIA is the Nation's premier source of energy information and, by law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the U.S. Government
- EIA does not propose or advocate any policy positions

## EIA produces data series, analyses, and energy projections

- Weekly, monthly, and annual data
  - Displays U.S. and regional production, stocks, blender inputs, imports, and exports
- Real-time analyses
  - Digests important developments in [Today in Energy](#), [This Week in Petroleum](#), [Issues & Trends](#), [Country Analysis Briefs](#), [Drilling Productivity Report](#)
- Short-Term Energy Outlook (STEO)
  - Forecasts U.S. supplies, demands, imports, stocks, and prices of energy with a horizon of 12 to 24 months
- Annual Energy Outlook (AEO)
  - Presents 25- to 30-year projection and analysis of U.S. energy supply, demand, and prices
- International Energy Outlook (IEO)
  - Assesses international energy production and consumption

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

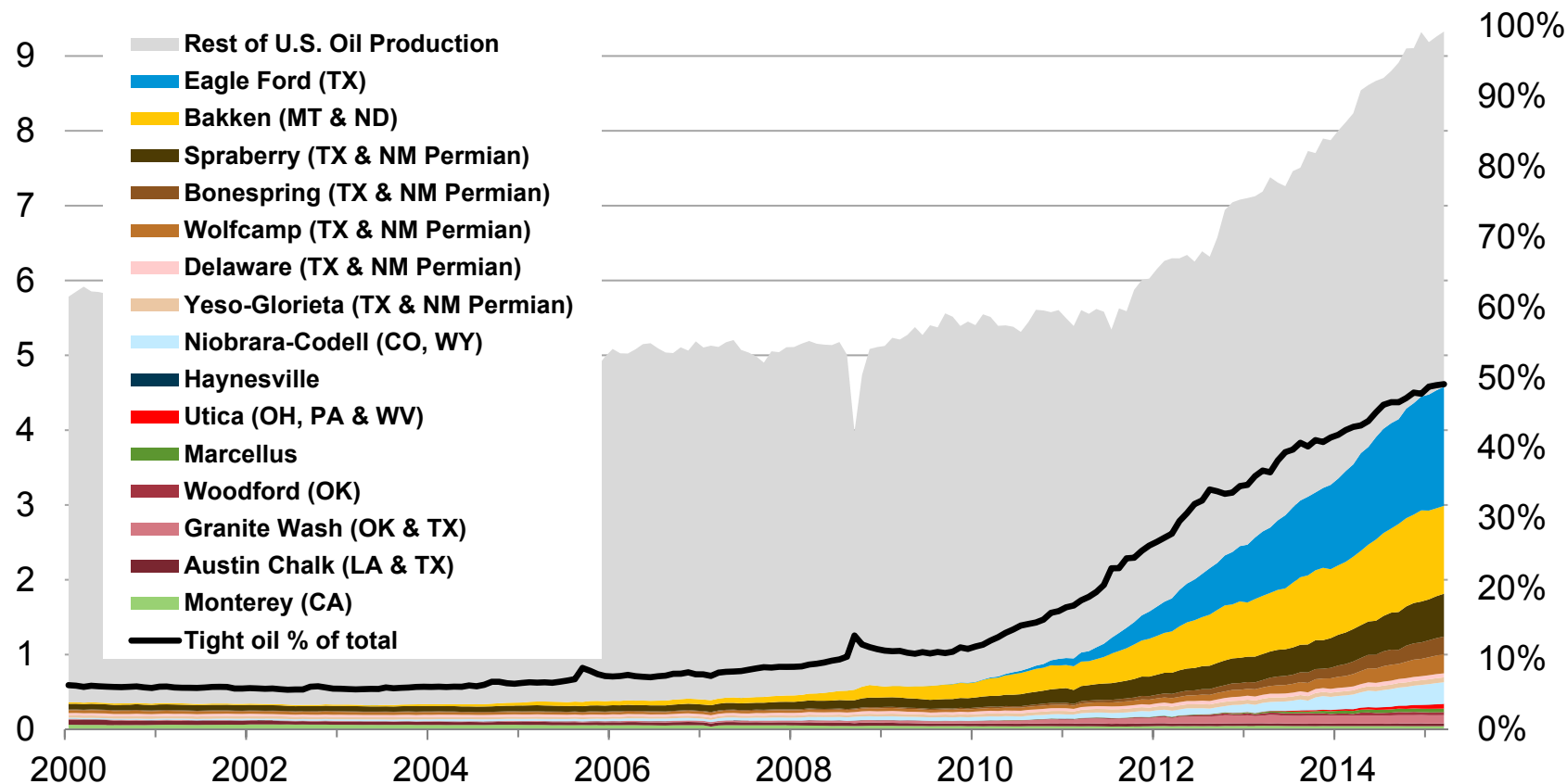


Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through March 2015 and represent EIA's official tight oil & shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).

# Estimated U.S. tight oil production was 4.6 MMbbl/d in April 2015 about 49% of total U.S. oil production (9.3 MMbbl/d)

Tight oil production  
million barrels of oil per day

Tight oil production as a  
percent of total oil production



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

# Shale gas and tight oil plays



## Tight oil characteristics vary considerably

- Prior to the “shale development breakthrough”
  - Drillers targeted either oil or natural gas formations
  - Production was relatively stable over a long period from each well
  - Simple rig count was sufficient to monitor and forecast production
  
- Drilling in tight formations
  - New applications of technology: Horizontal drilling and hydraulic fracturing
  - Pad drilling: Multiple wells per rig from one surface location
  - High initial production rates driven by better technology
  - Steep production declines
  - Formations yielding both oil and natural gas
  - Regional differences contrast rig and well productivity
  - Higher costs to drill and complete a well

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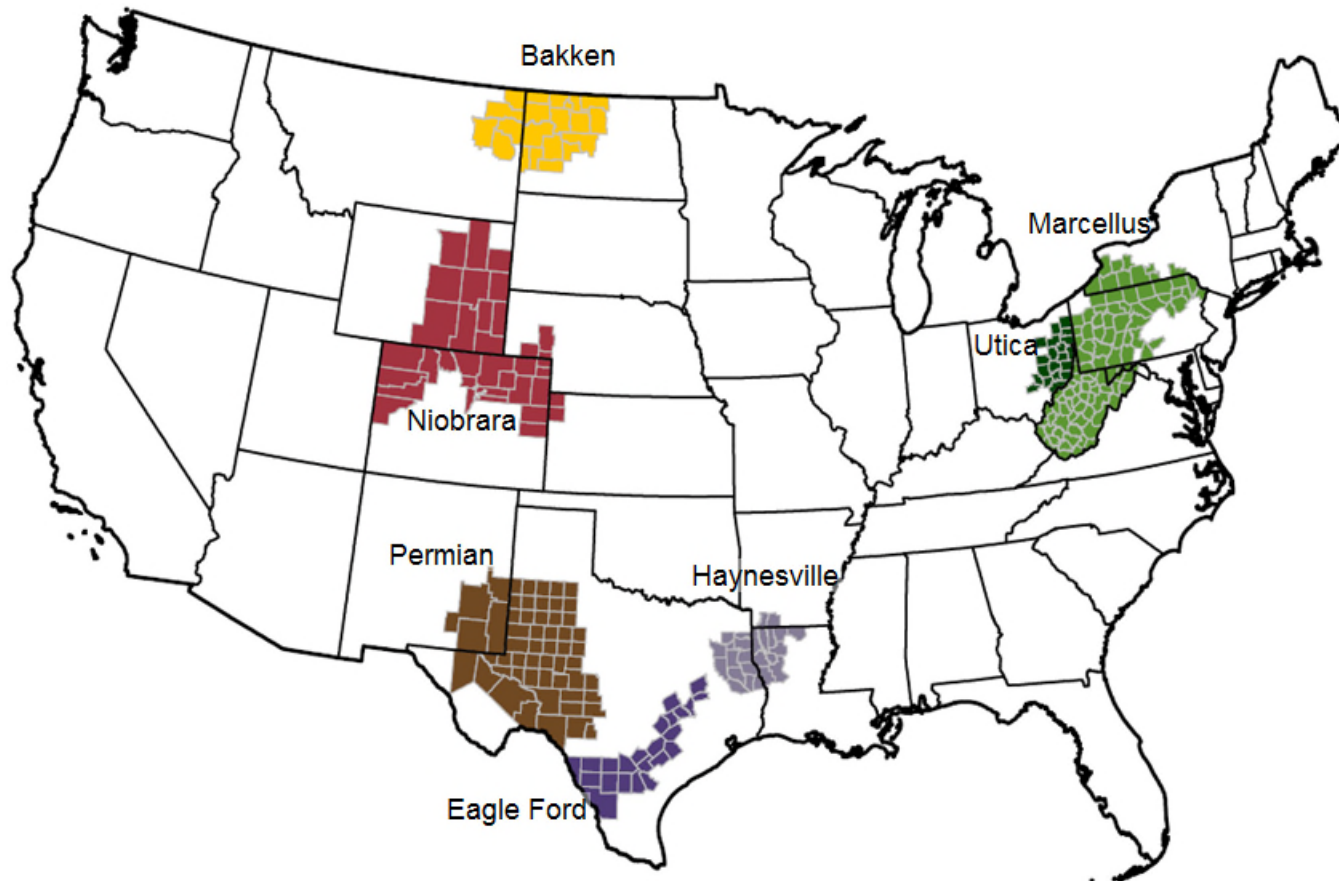
# Tight oil and shale gas trends: production by geography – the Drilling Productivity Report (DPR)

<http://www.eia.gov/petroleum/drilling/>



# Recent analysis has focused on production in the counties shown here

EIA Drilling Productivity Report regions



EIA Drilling Productivity Report : <http://www.eia.gov/petroleum/drilling/>



# PETROLEUM & OTHER LIQUIDS

OVERVIEW

DATA ▾

ANALYSIS & PROJECTIONS ▾

GLOSSARY >

FAQS

[SEE ALL PETROLEUM REPORTS](#)

## Drilling Productivity Report

Release Date: March 9, 2015 | Next Release: April 13, 2015 | [full report](#)

Previous Issue (pdf)

month:

New-well production per rig by region

Production by region

Region	Oil production thousand barrels/day			Gas production million cubic feet/day		
	March 2015	April 2015	change	March 2015	April 2015	change
Bakken	1,328	1,320	(8)	1,557	1,549	(8)
Eagle Ford	1,733	1,723	(10)	7,518	7,532	14
Haynesville	57	57	-	7,055	7,135	80
Marcellus	57	57	-	16,712	16,787	75
Niobrara	418	413	(5)	4,767	4,752	(15)
Permian	1,961	1,982	21	6,403	6,428	25
Utica	59	62	3	1,920	1,970	50

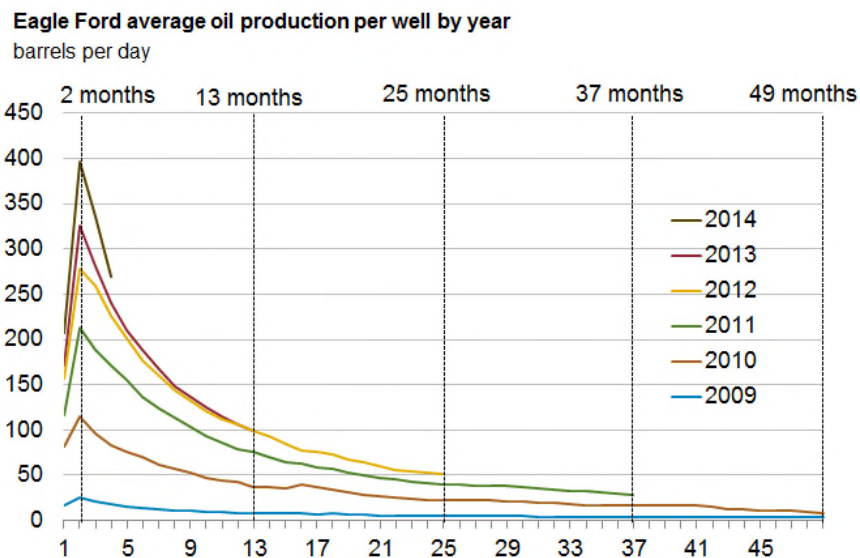
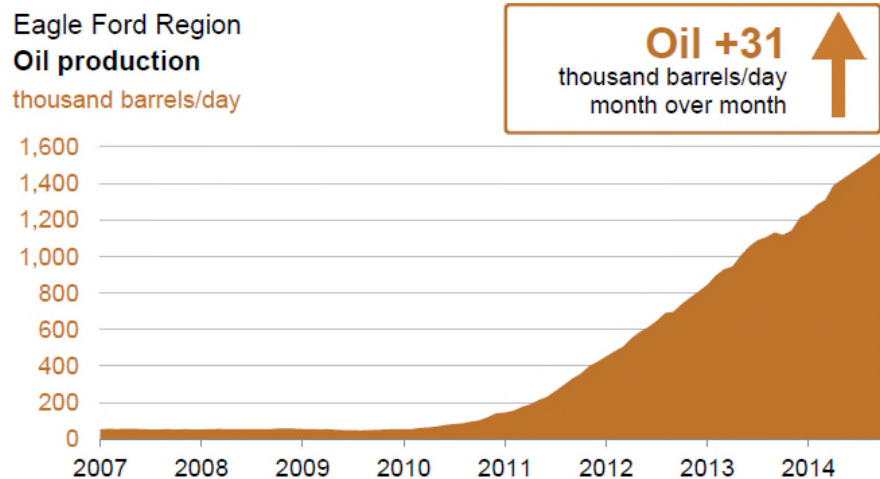
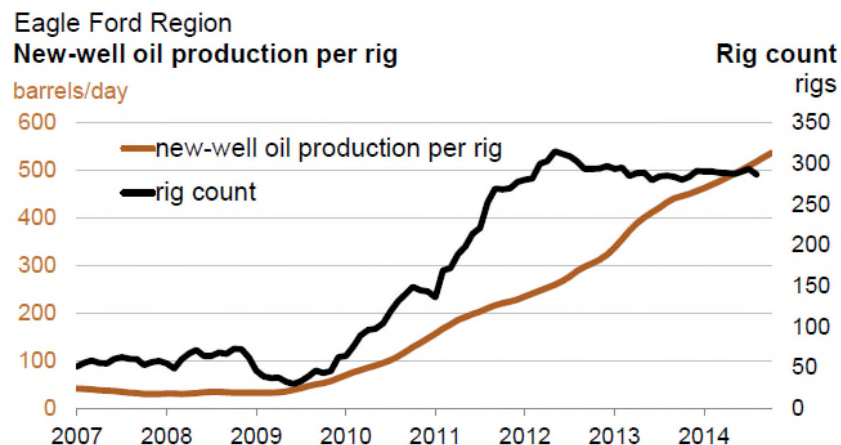
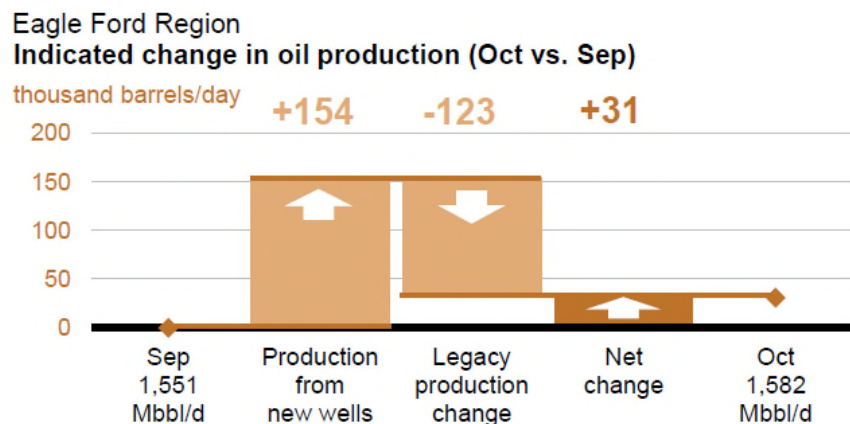
### Contents

- [Bakken](#)
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- [Haynesville](#)
- [Marcellus](#)
- [Niobrara](#)
- [Permian](#)
- [Utica](#)
  
- [Year-over-year summary](#)
- [Explanatory notes and sources](#)
- [Full report](#)

[Report data \(aggregated by region\)](#)

[Documentation](#)

# Drilling Productivity Report Captures Key Elements of Tight Oil



Source: EIA Drilling Productivity Report, Sept. 2014, DrillingInfo Inc.

## Contributing Factors to U.S. Tight Oil Production

- Technical Expertise and Experience
- Extensive Transportation Capacity
- Price Responsiveness of producers
- Regulatory Stability & Government Support

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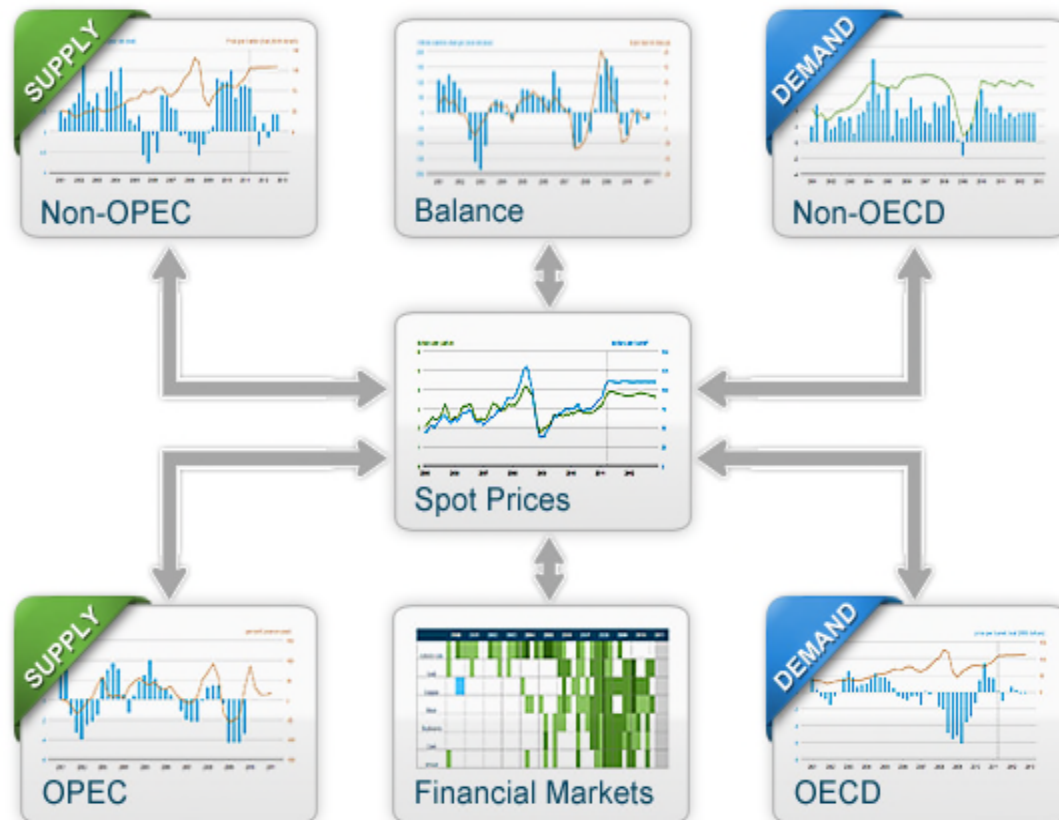
# Prices & Production

## Energy & Financial Markets

# WHAT DRIVES CRUDE OIL PRICES?

An analysis of 7 factors that influence oil markets, with chart data updated monthly and quarterly

### OVERVIEW



\$/bbl (real 2010 dollars, monthly average)



[Overview - What Drives Crude Oil Prices?](#)

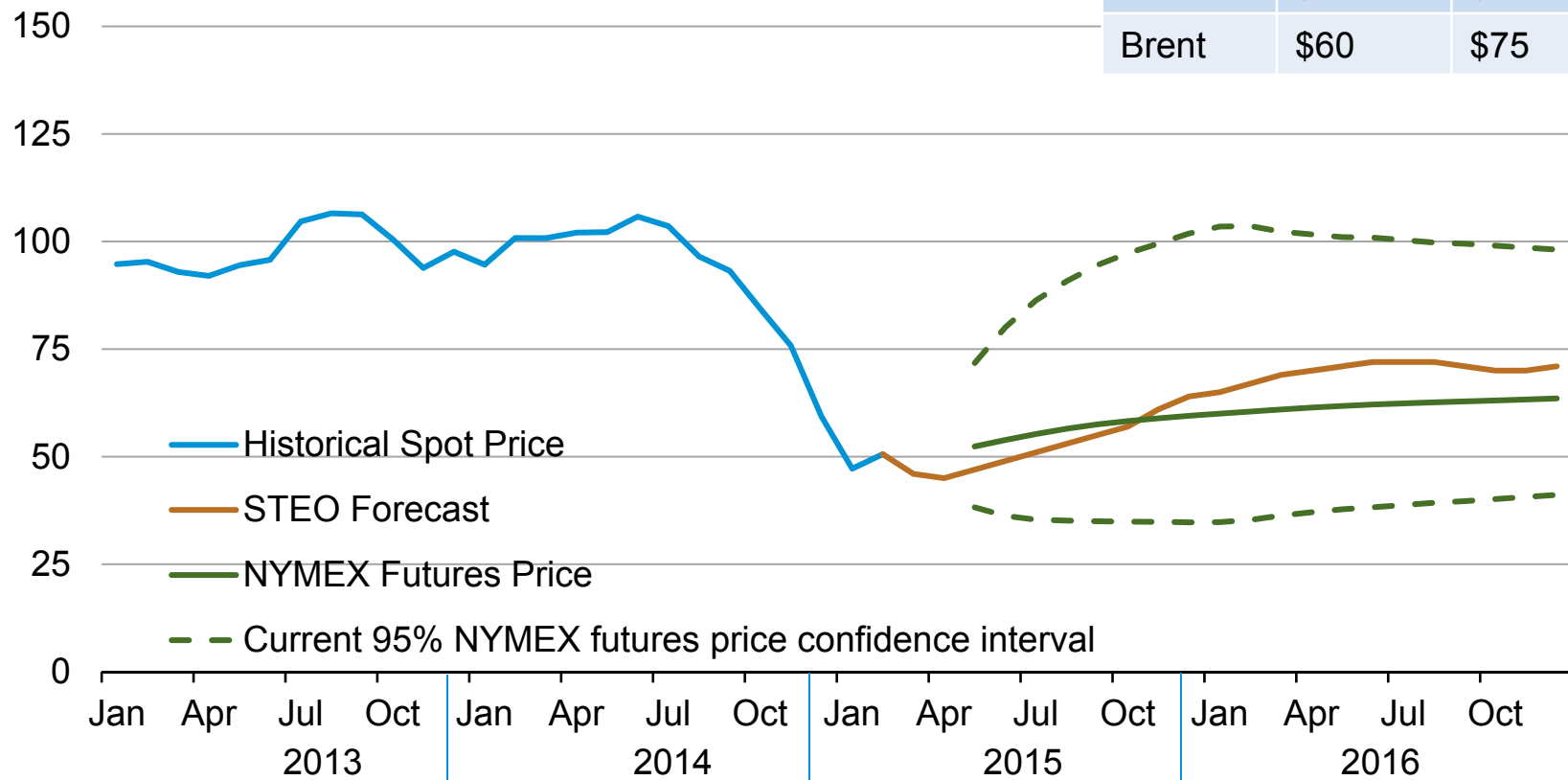
[Who's Who in Global Markets](#)

[Factors that Influence Prices](#)

# Oil prices rise from mid-2015 through mid-2016 in EIA's forecast – however, the market-implied confidence band is very wide

WTI price  
dollars per barrel

	2015	2016
WTI	\$52	\$70
Brent	\$60	\$75



Source: EIA, Short-Term Energy Outlook, April 2015

Various events could lead to changes in global supply or demand that could push future crude oil prices higher or lower than the STEO forecast

### Increase Prices

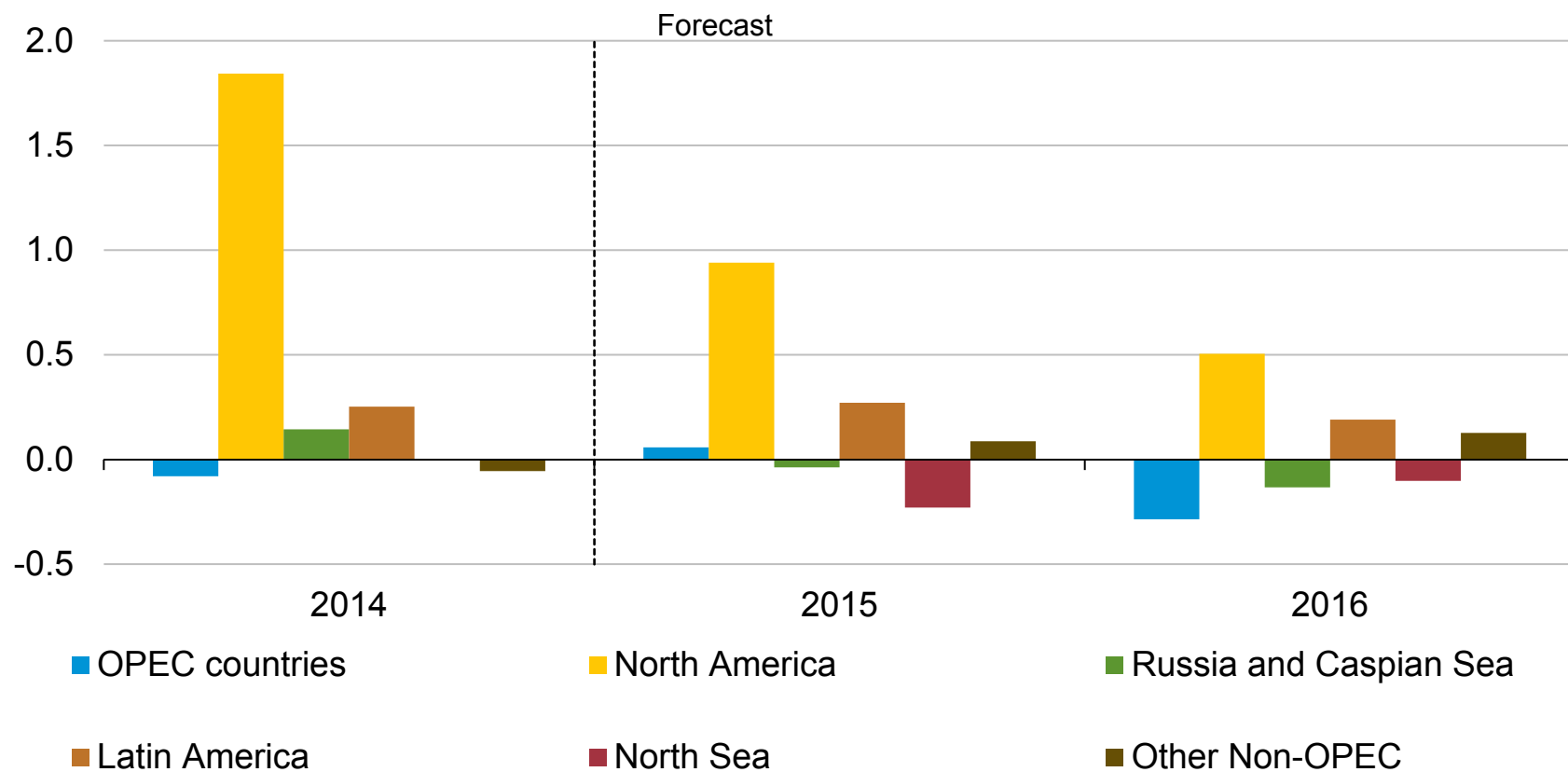
Event
ISIL disrupts Iraqi exports
Iranian sanctions are tightened
Social unrest in oil-dependent countries leads to supply disruptions
OPEC cuts output more than projected
World economic growth is lower than projected (e.g., China)
OPEC keeps production at 2015 levels in 2016
Reduction in unplanned production outages
Iranian sanctions are lifted

### Decrease Prices



# North American oil production growth slows with lower oil prices but remains the main driver of global production growth

World crude oil and liquid fuels production growth  
million barrels per day

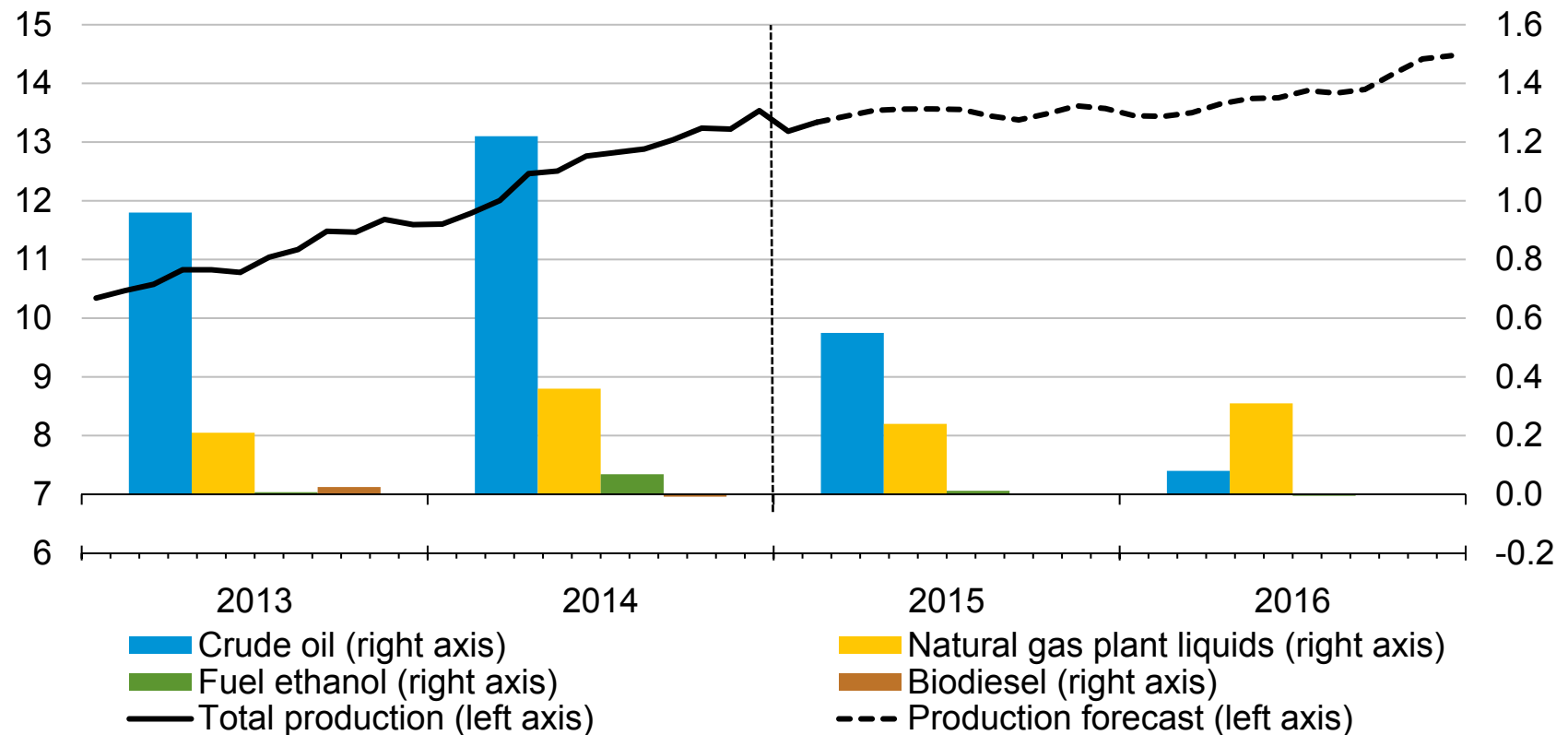


Source: EIA, Short-Term Energy Outlook, March 2015

U.S. crude oil production is expected to increase 700,000 bbl/d in 2015 and 140,000 in 2016; if prices do not recover to the mid-\$70s by mid-2016 as forecast by EIA, production would be lower

U.S. crude oil and liquid fuels production  
million barrels per day

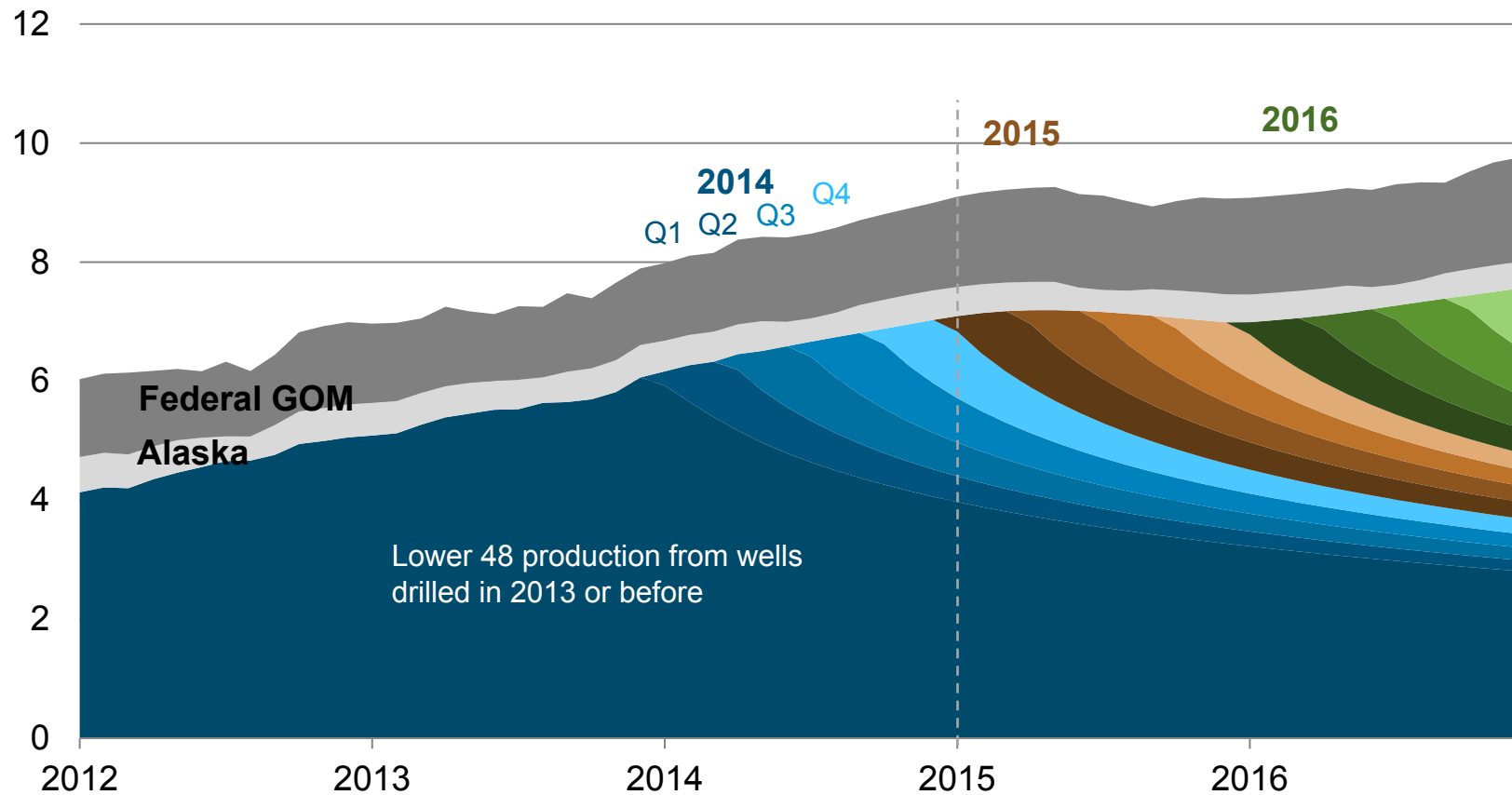
annual change  
million barrels per day



Source: EIA, Short-Term Energy Outlook, March 2015

# January 2015 STEO had Lower 48 y/y growth in 2015 of 580,000 bbl/d and in 2016 130,000 bbl/d.

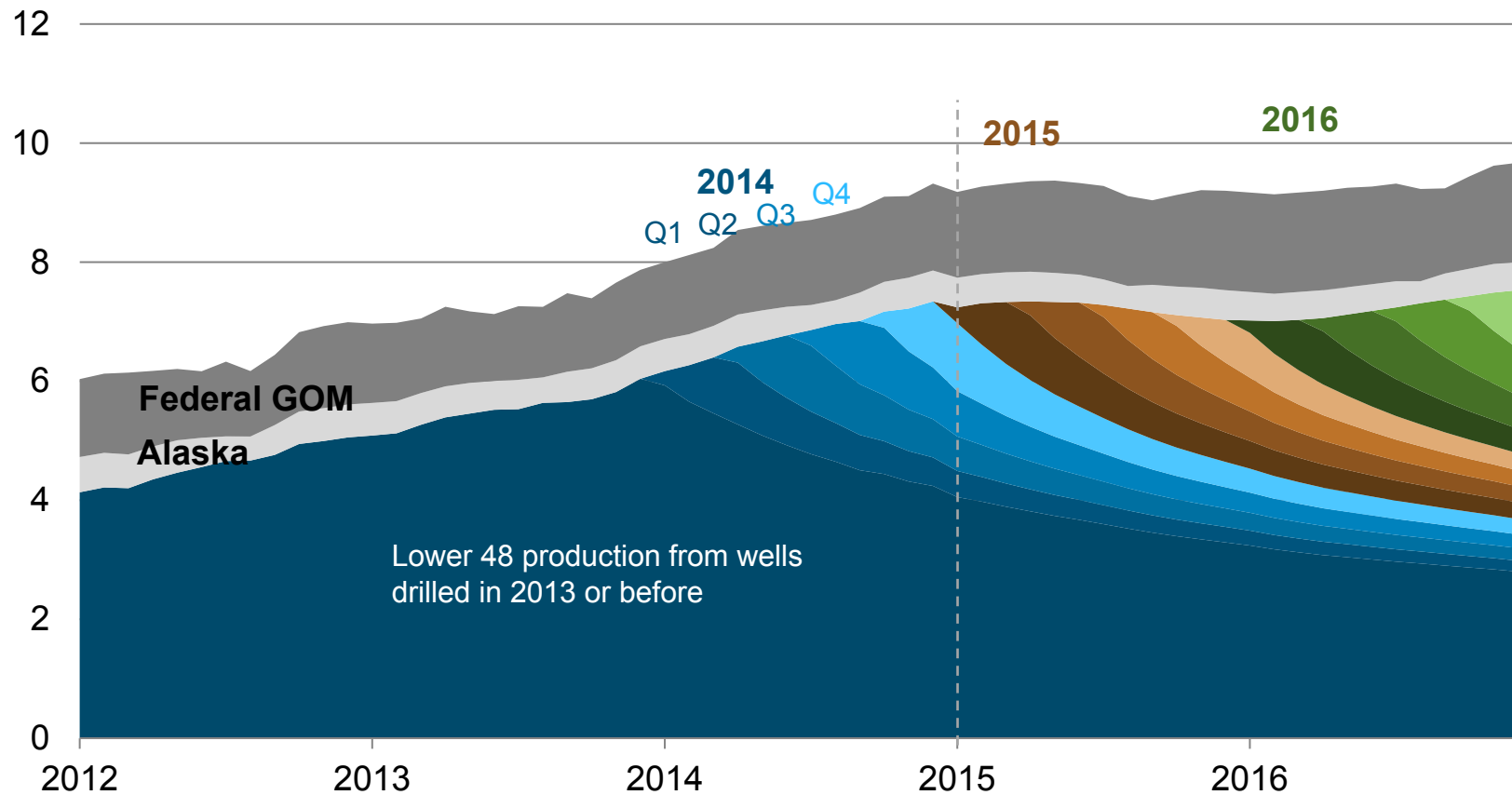
U.S. monthly crude oil production  
million barrels per day



Source: EIA, Today in Energy 1/26/2015 <http://www.eia.gov/todayinenergy/detail.cfm?id=19711>

# April 2015 STEO shows Lower 48 y/y growth in 2015 of 454,000 bbl/d and in 2016 a mere 10,000 bbl/d.

U.S. monthly crude oil production  
million barrels per day

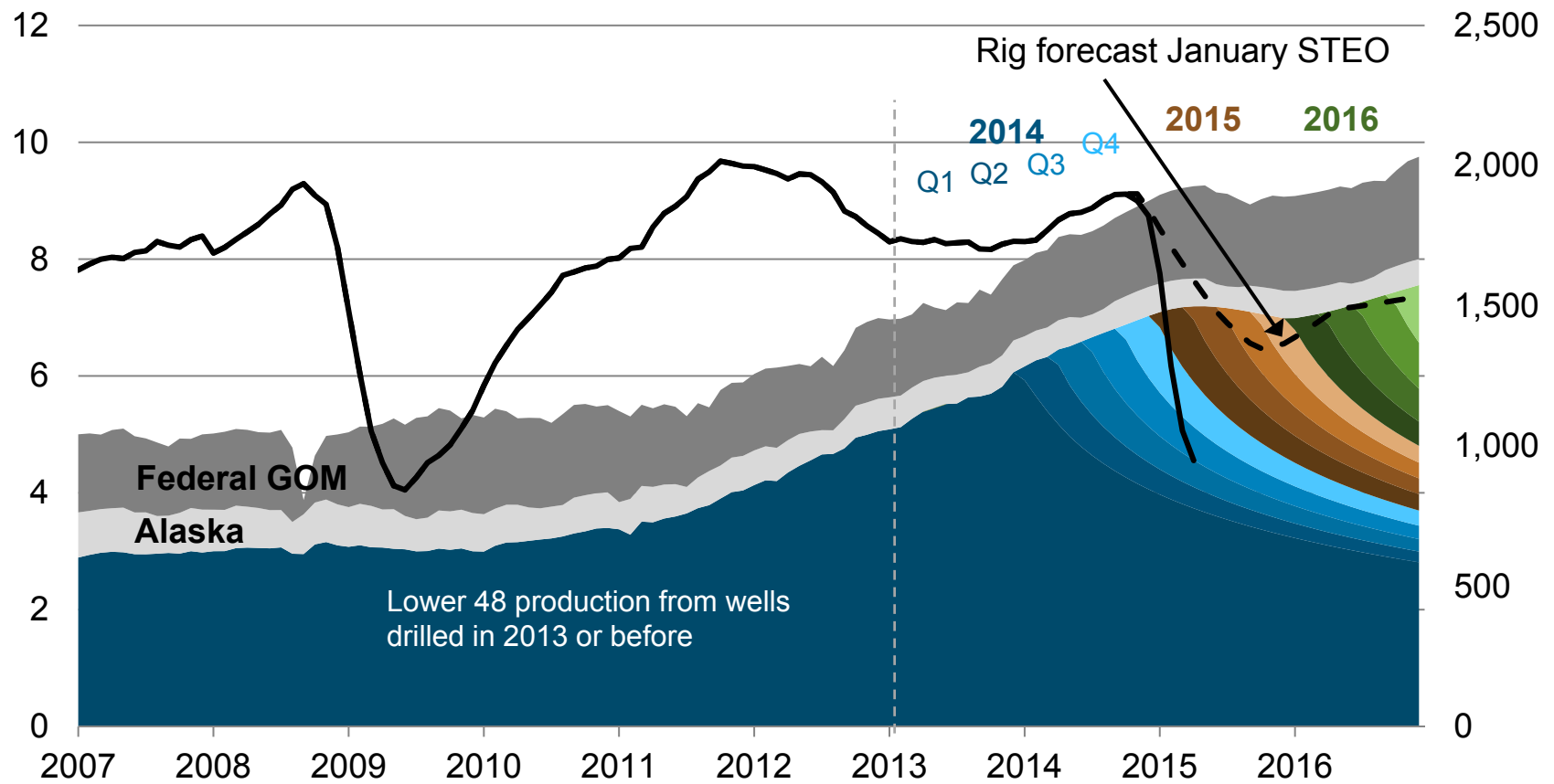


Source: EIA, Short-Term Energy Outlook (STEO) April 2015

# Rigs drilling will decrease, but a backlog of oil wells awaiting completion & productivity increases will add to oil production

U.S. monthly crude oil production  
million barrels per day

Total U.S. onshore rig count



Source: EIA, Today in Energy 1/26/2015 <http://www.eia.gov/todayinenergy/detail.cfm?id=19711>

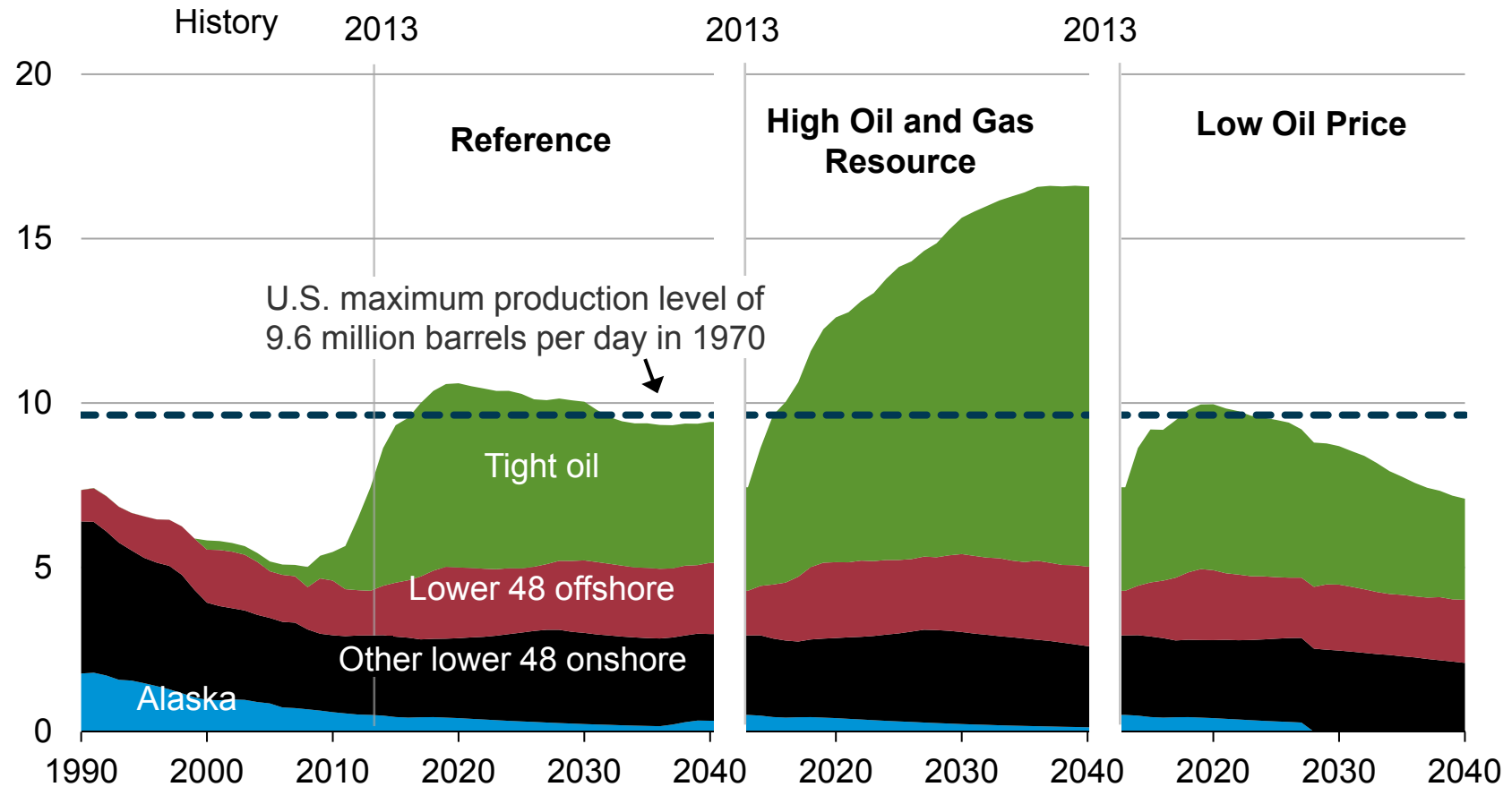
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# Annual Energy Outlook 2015: Petroleum and other liquid supply

<http://www.eia.gov/forecasts/aeo/>

# U.S. crude oil production rises above previous historical highs before 2020 in all AEO2015 cases, with a range of longer-term outcomes

U.S. crude oil production  
million barrels per day



Source: EIA, Annual Energy Outlook 2015

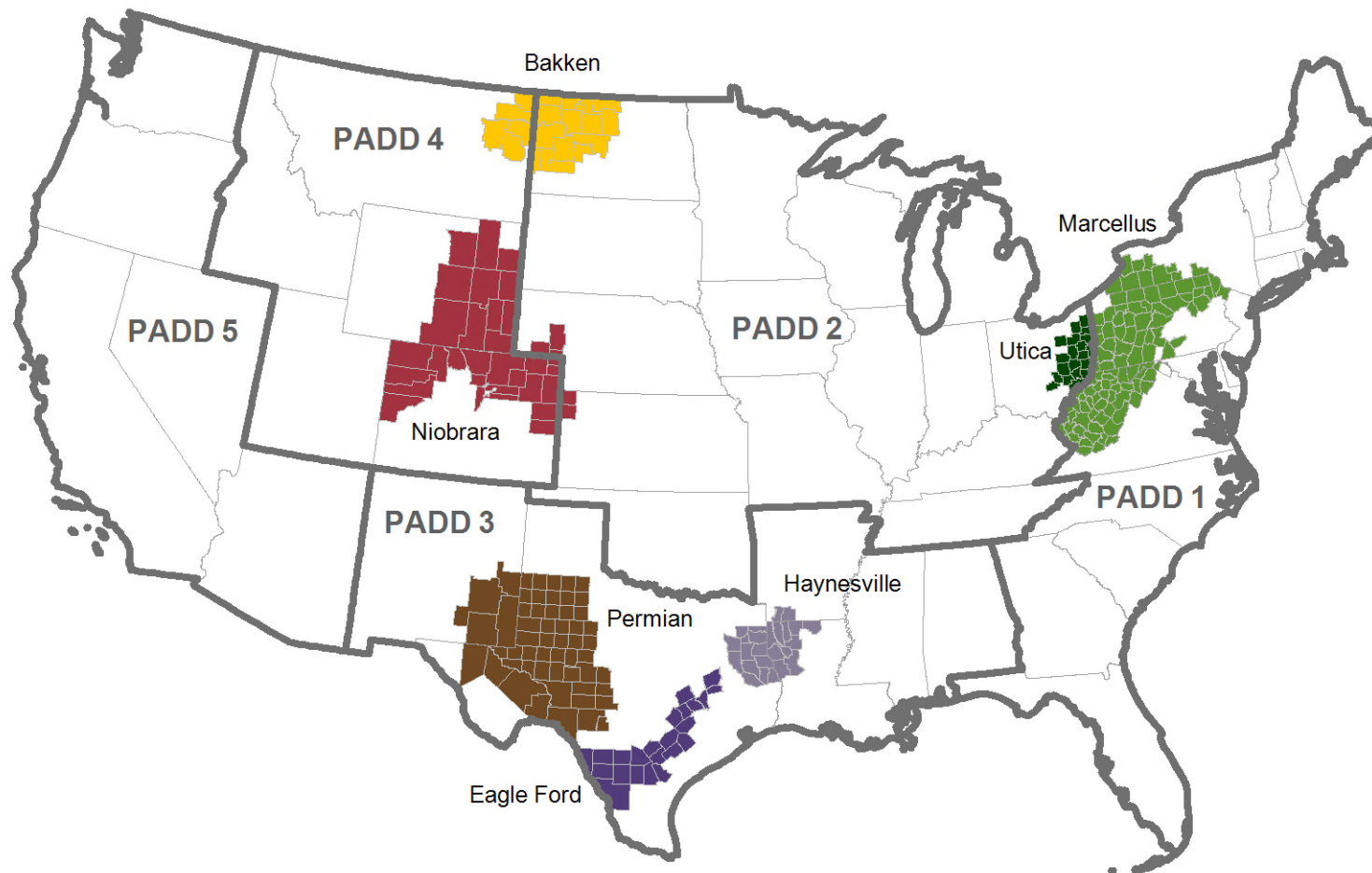
# Crude by Rail



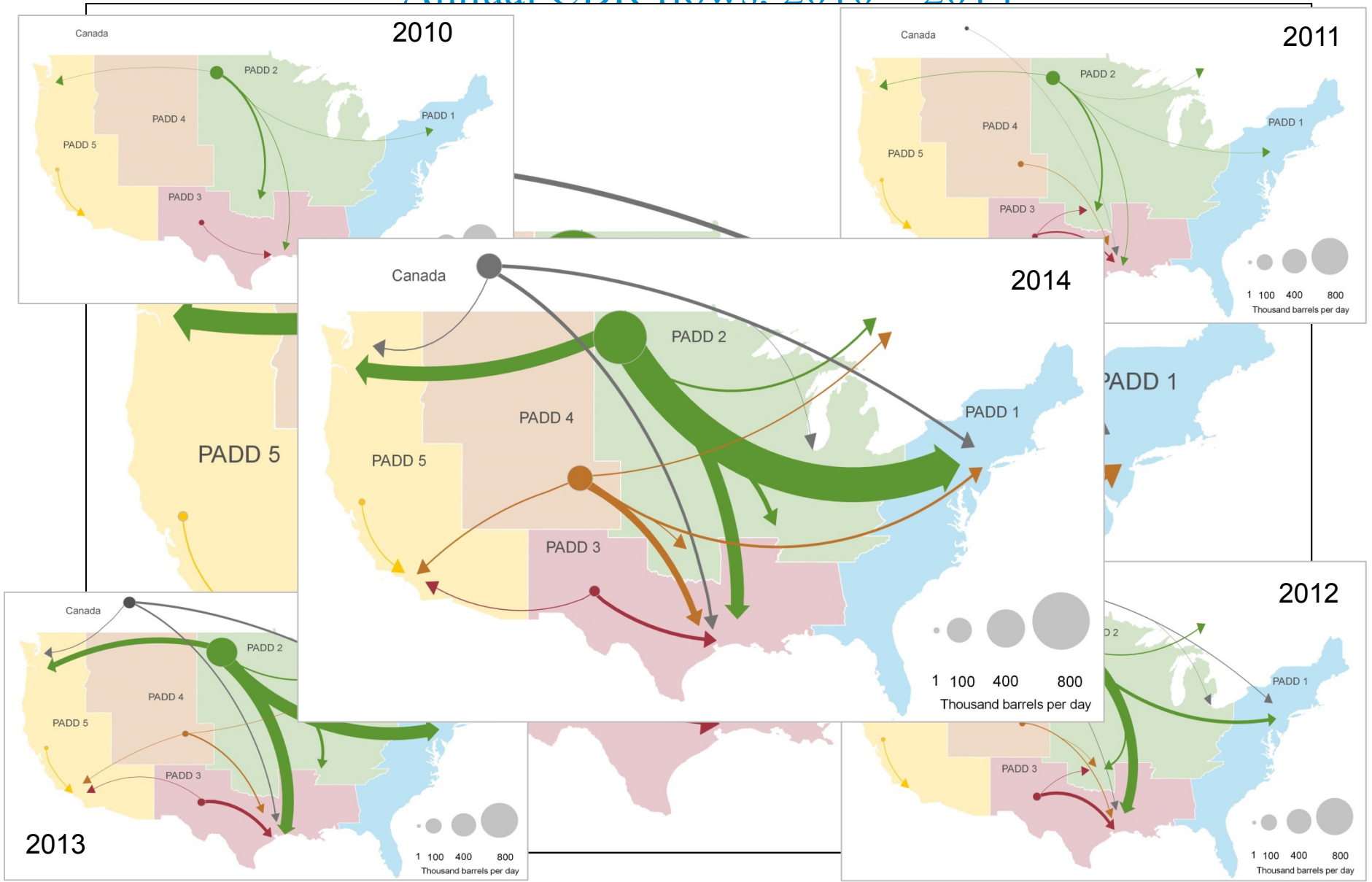
## EIA crude-by-rail project overview

- EIA published monthly crude-by-rail (CBR) data at the end of March 2015 along with its monthly petroleum supply balances
- EIA's new data series provides historical monthly data starting in January 2010
- The data include inter-regional, intra-regional, and cross border CBR traffic between the U.S. and Canada
- Developed using data from the Surface Transportation Board (STB) and Canada's National Energy Board (NEB)
- EIA's most recent monthly data are estimated

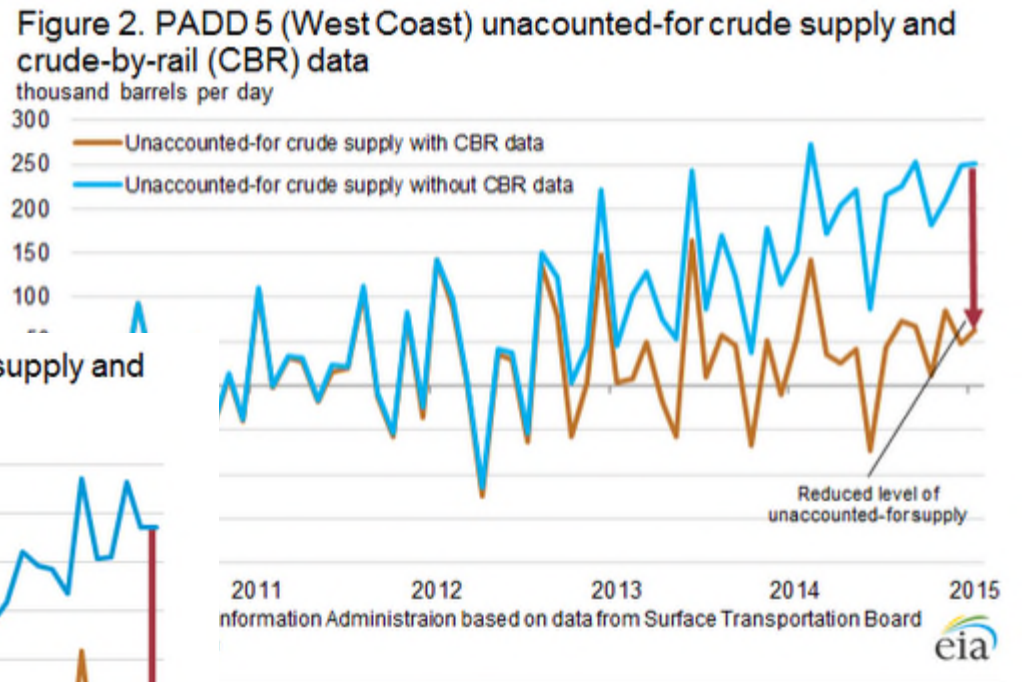
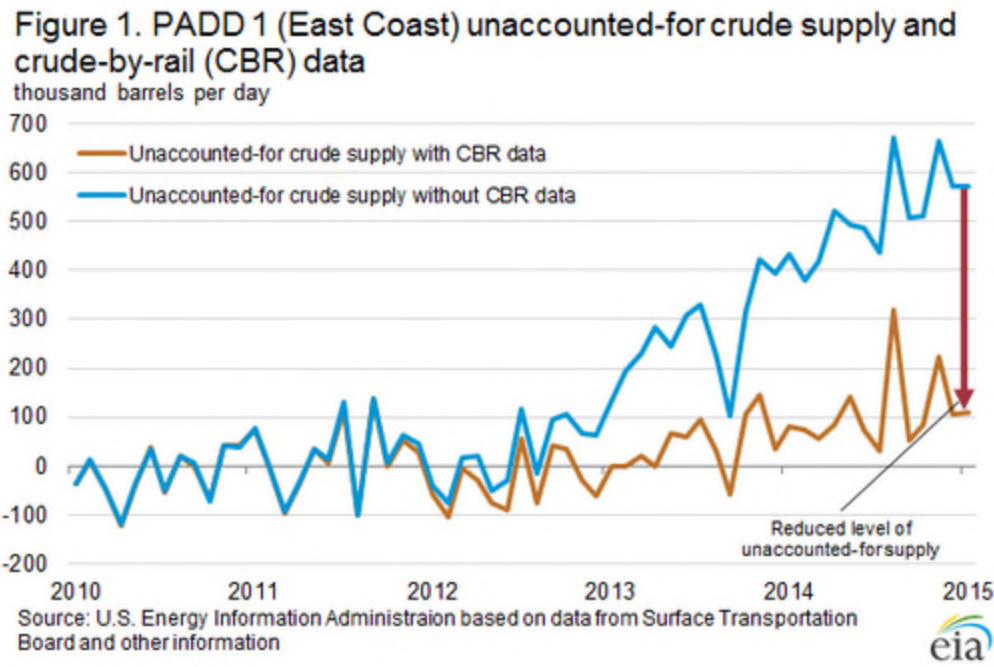
# Petroleum Administration for Defense Districts (PADDs) with major shale oil producing areas that indicate CBR originations



# Annual CBR flows, 2010 – 2014



# Unaccounted-for crude oil is minimized on a regional basis with the inclusion of rail data



# EIA's new webpage dedicated to crude-by-rail movements

## U.S. Movements of Crude Oil By Rail


With Data through January 2015 | Release Date: March 30, 2015 | Next Release Date: April 29, 2015

Summary - mbbl/d		Summary - mbbl		Changes by PADD				
<b>Crude oil movements by rail, January 2015</b>								
thousand barrels/day								
	Receipts							
Shipments	PADD 1	PADD 2	PADD 3	PADD 4	PADD 5	United States	Canada	
PADD 1	0	0	0	0	0	0	0	
PADD 2	437	40	57	0	171	704	28	
PADD 3	0	0	40	0	7	47	0	
PADD 4	26	15	107	0	9	157	15	
PADD 5	0	0	0	0	6	6	0	
United States	463	55	203	0	193	914	43	
Canada	61	14	50	0	6	130	NA	
Total	523	69	253	0	199	1,045	NA	

NA = data not available  
PADD = Petroleum Administration for Defense District  
Note: Includes movements to and from Canada  
Source: U.S. Energy Information Administration estimates based on analysis of data from the Surface Transportation Board and others.

<http://www.eia.gov/petroleum/transportation>

### Data Tables (monthly, 2010-2015)

- Movements of crude oil by rail
- Movements by rail between PAD Districts
- Movements by pipeline, tanker, barge and rail between PAD Districts
- Net receipts by pipeline, tanker, barge and rail between PAD Districts
-  Movements of crude oil by pipeline, tanker, barge, and rail between PAD Districts (for current month)

### Press Release

- [March 30, 2015](#)

### Related Articles

- [New EIA monthly data tracks crude oil movements by rail - Today in Energy, 3/31/15](#)
- [Rail shipments of oil and petroleum products through October up 13% over year-ago period - Today in Energy, 11/13/14](#)
- [Crude delivered by rail continues to supply West Coast refineries - This Week in Petroleum, 10/1/14](#)
- [Rail deliveries of U.S. oil continue to increase in 2014 - Today in Energy,](#)

# Summary table of CBR data include inter-PADD, intra-PADD, and U.S.-Canada movements

## Movements of Crude Oil by Rail

Product:  Period-Unit:

[Download Series History](#) [Definitions, Sources & Notes](#)

Show Data By:  
 Product  Areas

		Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	View History
<b>Summary</b>								
Total	<input type="checkbox"/>	31,628	32,298	33,338	32,947	34,862	33,706	2010-2015
Intra-U.S. Movements	<input type="checkbox"/>	26,096	28,465	28,398	26,192	30,309	28,340	2010-2015
U.S. Exports to Canada	<input type="checkbox"/>	1,868	1,061	1,423	2,221	816	1,326	2010-2015
U.S. Imports from Canada	<input type="checkbox"/>	3,663	2,772	3,517	4,535	3,737	4,040	2010-2015
<b>From PADD 1 to</b>								
Total	<input type="checkbox"/>	1	0	0	0	0	0	2010-2015
U.S.	<input type="checkbox"/>	1	0	0	0	0	0	2010-2015
PADD 1	<input type="checkbox"/>	1						2010-2014
PADD 2	<input type="checkbox"/>	0	0	0	0	0	0	2010-2015
PADD 3	<input type="checkbox"/>							2010-2011
PADD 4	<input type="checkbox"/>	0	0	0	0	0	0	2014-2015
PADD 5	<input type="checkbox"/>							2011-2011
Canada	<input type="checkbox"/>	0	0	0	0	0	0	2011-2015
<b>From PADD 2 to</b>								
Total	<input type="checkbox"/>	20,910	23,362	22,839	23,024	23,462	22,688	2010-2015
U.S.	<input type="checkbox"/>	20,035	22,706	21,801	20,996	22,839	21,833	2010-2015
PADD 1	<input type="checkbox"/>	10,456	12,608	12,438	12,714	13,224	13,538	2010-2015
PADD 2	<input type="checkbox"/>	1,226	964	519	860	1,004	1,243	2010-2015
PADD 3	<input type="checkbox"/>	4,249	4,014	4,401	4,221	3,499	1,756	2010-2015
PADD 4	<input type="checkbox"/>	0	0	0	0	0	0	2012-2015
PADD 5	<input type="checkbox"/>	4,103	5,120	4,443	3,201	5,112	5,296	2010-2015
Canada	<input type="checkbox"/>	874	656	1,037	2,028	622	855	2011-2015

[http://www.eia.gov/dnav/pet/PET\\_MOVE\\_RAILNA\\_A\\_EPC0\\_RAIL\\_MBBL\\_M.htm](http://www.eia.gov/dnav/pet/PET_MOVE_RAILNA_A_EPC0_RAIL_MBBL_M.htm)

# Inter-PADD rail movements are comparable to pipeline and waterborne movements of crude oil

## Movements of Crude Oil by Rail between PAD Districts

Product:  Period-Unit:

[Download Series History](#) [Definitions, Sources & Notes](#)

Show Data By:	Graph	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	View History
<input type="radio"/> Product <input checked="" type="radio"/> Areas	Clear							
<b>From PADD 1 to</b>								
PADD 2	<input type="checkbox"/>	0	0	0	0	0	0	<a href="#">2010-2015</a>
PADD 3	<input type="checkbox"/>							<a href="#">2010-2011</a>
PADD 4	<input type="checkbox"/>	0	0	0	0	0	0	<a href="#">2014-2015</a>
PADD 5	<input type="checkbox"/>							<a href="#">2011-2011</a>
<b>From PADD 2 to</b>								
PADD 1	<input type="checkbox"/>	10,456	12,608	12,438	12,714	13,224	13,538	<a href="#">2010-2015</a>
PADD 3	<input type="checkbox"/>	4,249	4,014	4,401	4,221	3,499	1,756	<a href="#">2010-2015</a>
PADD 4	<input type="checkbox"/>	0	0	0	0	0	0	<a href="#">2012-2015</a>
PADD 5	<input type="checkbox"/>	4,103	5,120	4,443	3,201	5,112	5,296	<a href="#">2010-2015</a>
<b>From PADD 3 to</b>								
PADD 1	<input type="checkbox"/>							<a href="#">2010-2011</a>
PADD 2	<input type="checkbox"/>	69	0	0	0	43	0	<a href="#">2010-2015</a>
PADD 4	<input type="checkbox"/>	0	0	0	0	0	0	<a href="#">2010-2015</a>
PADD 5	<input type="checkbox"/>	269	140	131	345	289	214	<a href="#">2011-2015</a>
<b>From PADD 4 to</b>								
PADD 1	<input type="checkbox"/>	417	1,035	708	525	1,218	809	<a href="#">2014-2015</a>
PADD 2	<input type="checkbox"/>	253	125	502	384	512	463	<a href="#">2012-2015</a>
PADD 3	<input type="checkbox"/>	2,721	2,372	3,162	2,512	3,381	3,305	<a href="#">2010-2015</a>
PADD 5	<input type="checkbox"/>	400	310	694	175	840	293	<a href="#">2012-2015</a>

[http://www.eia.gov/dnav/pet/PET\\_MOVE\\_RAIL\\_A\\_EPC0\\_RAIL\\_MBBL\\_M.htm](http://www.eia.gov/dnav/pet/PET_MOVE_RAIL_A_EPC0_RAIL_MBBL_M.htm)

# Crude oil movements by mode data table now includes rail

## Movements by Tanker, Pipeline, Barge and Rail between PAD Districts

Product:  Period-Unit:

<a href="#">Download Series History</a> <a href="#">Definitions, Sources &amp; Notes</a>		Graph	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	View History
Show Data By: <input type="radio"/> Product <input checked="" type="radio"/> Areas		Clear							
<b>From PADD 1 to</b>									
PADD 2	<input type="checkbox"/>		333	318	296	374	365	333	1986-2015
PADD 3	<input type="checkbox"/>		1,139	999	1,487	727	871	590	1986-2015
PADD 4	<input type="checkbox"/>		0	0	0	0	0	0	2014-2015
PADD 5	<input type="checkbox"/>								2011-2011
<b>From PADD 2 to</b>									
PADD 1	<input type="checkbox"/>		11,053	13,099	12,934	13,180	13,699	14,113	1986-2015
PADD 3	<input type="checkbox"/>		24,503	23,820	27,352	25,275	26,274	26,208	1986-2015
PADD 4	<input type="checkbox"/>		3,626	3,527	3,773	4,254	4,587	4,969	1986-2015
PADD 5	<input type="checkbox"/>		4,103	5,120	4,443	3,201	5,112	5,296	2010-2015
<b>From PADD 3 to</b>									
PADD 1	<input type="checkbox"/>		636	526	835	789	1,505	789	1986-2015
PADD 2	<input type="checkbox"/>		28,141	28,175	22,704	24,060	24,555	24,219	1986-2015
PADD 4	<input type="checkbox"/>		0	0	0	0	0	0	2004-2015
PADD 5	<input type="checkbox"/>		269	140	131	345	289	350	1986-2015
<b>From PADD 4 to</b>									
PADD 1	<input type="checkbox"/>		417	1,035	708	525	1,218	809	2013-2015
PADD 2	<input type="checkbox"/>		7,767	8,187	8,461	8,376	9,431	9,891	1986-2015
PADD 3	<input type="checkbox"/>		3,145	2,757	3,571	2,883	3,779	3,726	1986-2015
PADD 5	<input type="checkbox"/>		400	310	694	175	840	293	2011-2015

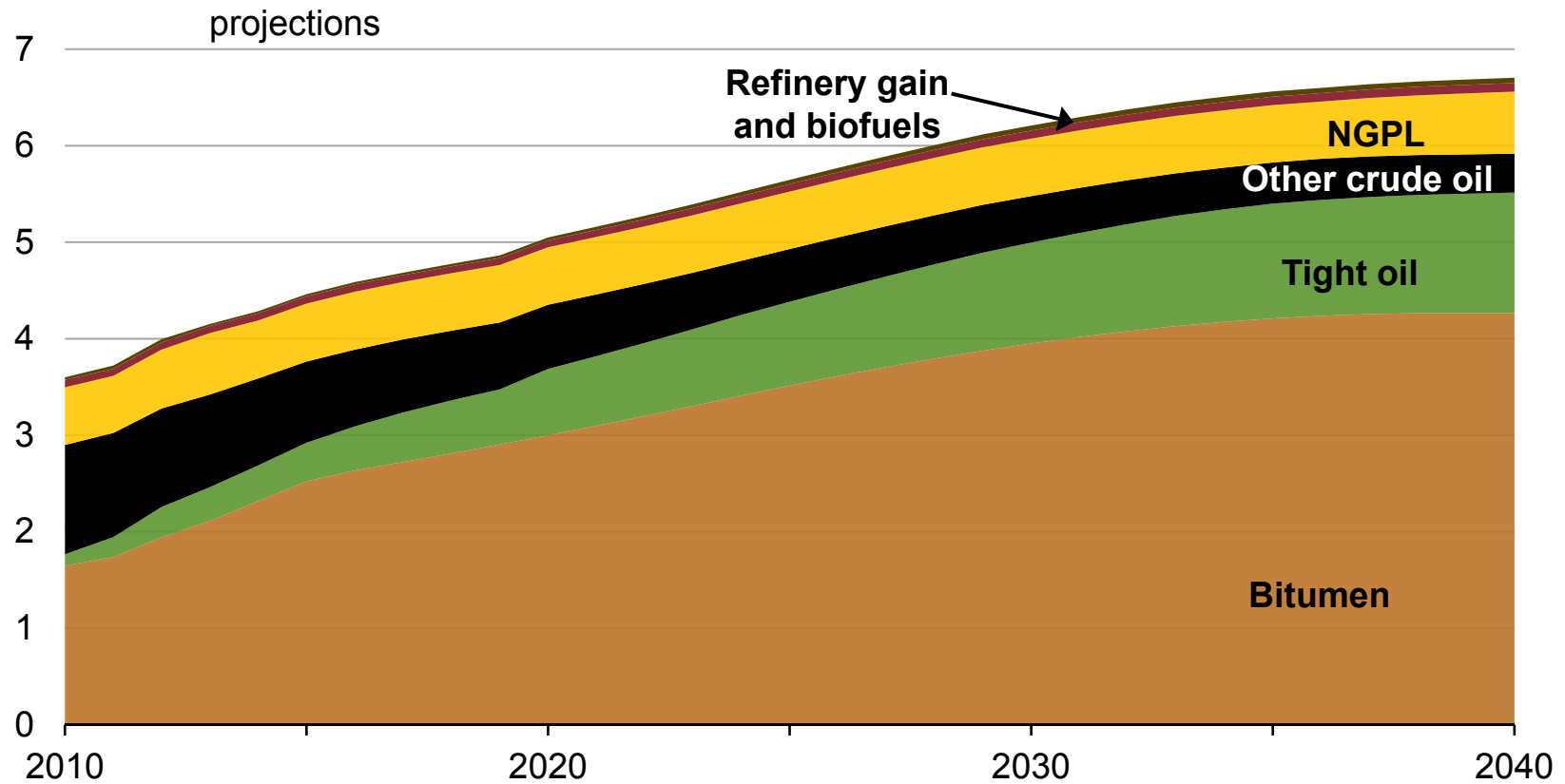
[http://www.eia.gov/dnav/pet/PET\\_MOVE\\_PTBA\\_EPC0\\_TNR\\_MBBL\\_M.htm](http://www.eia.gov/dnav/pet/PET_MOVE_PTBA_EPC0_TNR_MBBL_M.htm)



# Canada

# Canadian liquids production is projected to reach 5 million bbl/d by 2020, of which bitumen is 3 million bbl/d

Canadian liquid fuels production, Reference case  
million barrels per day

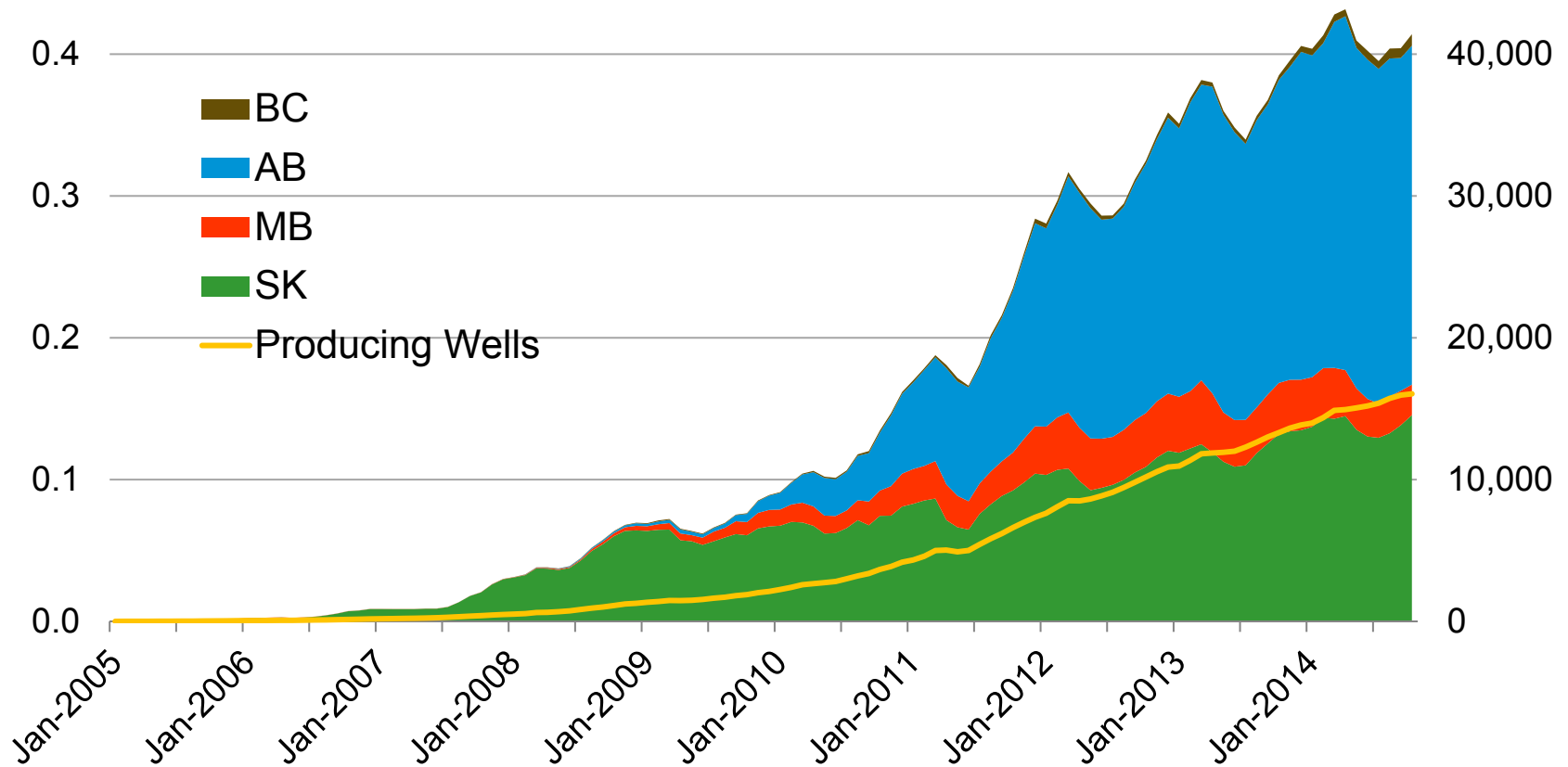


Source: EIA, International Energy Outlook 2014

# Canadian tight oil production surpassed 0.4 million barrels per day in 2014 mainly from Saskatchewan and Alberta

Canadian tight oil production  
million barrels per day

Producing well count



Source: Canada NEB 2014

## For more information

U.S. Energy Information Administration home page | [www.eia.gov](http://www.eia.gov)

Annual Energy Outlook | [www.eia.gov/forecasts/aeo](http://www.eia.gov/forecasts/aeo)

Short-Term Energy Outlook | [www.eia.gov/forecasts/steo](http://www.eia.gov/forecasts/steo)

International Energy Outlook | [www.eia.gov/forecasts/ieo](http://www.eia.gov/forecasts/ieo)

Today In Energy | [www.eia.gov/todayinenergy](http://www.eia.gov/todayinenergy)

Monthly Energy Review | [www.eia.gov/totalenergy/data/monthly](http://www.eia.gov/totalenergy/data/monthly)

State Energy Portal | [www.eia.gov/state](http://www.eia.gov/state)

Drilling Productivity Report | [www.eia.gov/petroleum/drilling](http://www.eia.gov/petroleum/drilling)

# Supplemental Slides

## New AEO table browser

- Signature product redeveloped for EIA's state-of-the-art table browser experience
- Compares up to 6 cases from AEO

Annual Energy Outlook 2014  
Table: Total Energy Supply, Disposition, and Price Summary

**PUBLICATIONS**

- Annual Energy Outlook 2014
- Effect of Increased LNG Exports on U.S. Energy Markets
- International Energy Outlook 2014
- Annual Energy Outlook 2014 Early Release
- Annual Energy Outlook 2013
- International Energy Outlook 2013
- Annual Energy Outlook 2013 Supplement
- Annual Energy Outlook 2013 Early Release
- Annual Energy Outlook 2012
- Annual Energy Outlook 2012 Early Release
- Analysis of Impacts of the Clean Energy Standard Act of 2012
- Annual Energy Outlook 2011
- Effect of Increased Natural Gas Exports on Domestic Energy Markets

**TABLES** BROWSE: ALL TABLES | BY SUBJECT

- Total Energy Supply, Disposition, and Price Summary
- Energy Consumption by Sector and Source
- Energy Prices by Sector and Source
- Residential Sector Key Indicators and Consumption
- Commercial Sector Key Indicators and Consumption
- Industrial Sector Key Indicators and Consumption
- Transportation Sector Key Indicators and Delivered Energy Consumption
- Electricity Supply, Disposition, Prices, and Emissions
- Electricity Generating Capacity
- Electricity Trade
- Petroleum and Other Liquids Supply and Disposition
- Petroleum and Other Liquids Prices
- Natural Gas Supply, Disposition, and Prices
- Oil and Gas Supply

CHART INDEXING OPTIONS: **None** Index to Start as Percent Index to Start as Value

Annual Energy Outlook 2014  
Table: Total Energy Supply, Disposition, and Price Summary  
Case: Reference case

PUBLICATIONS & TABLES CASES & SCENARIOS ? HELP DOWNLOAD

Annual Every 5th Year History & Last 2011 2040

	2011	2036	2037	2038	2039	2040	Growth Rate
<b>Production</b>							
Crude Oil and Lease Condensate (quad Btu)	56	16.45	16.15	16.10	16.00		0.51
Natural Gas Plant Liquids (quad Btu)	05	4.09	4.07	4.03	3.99		0.78
Dry Natural Gas (quad Btu)	16	37.49	37.86	38.18	38.37		1.60
Coal <sup>1</sup> (quad Btu)	57	22.33	22.32	22.45	22.61		0.33
Nuclear / Uranium <sup>2</sup> (quad Btu)	27	8.32	8.37	8.43	8.49		0.19
Hydropower (quad Btu)	89	2.89	2.89	2.90	2.90		0.29

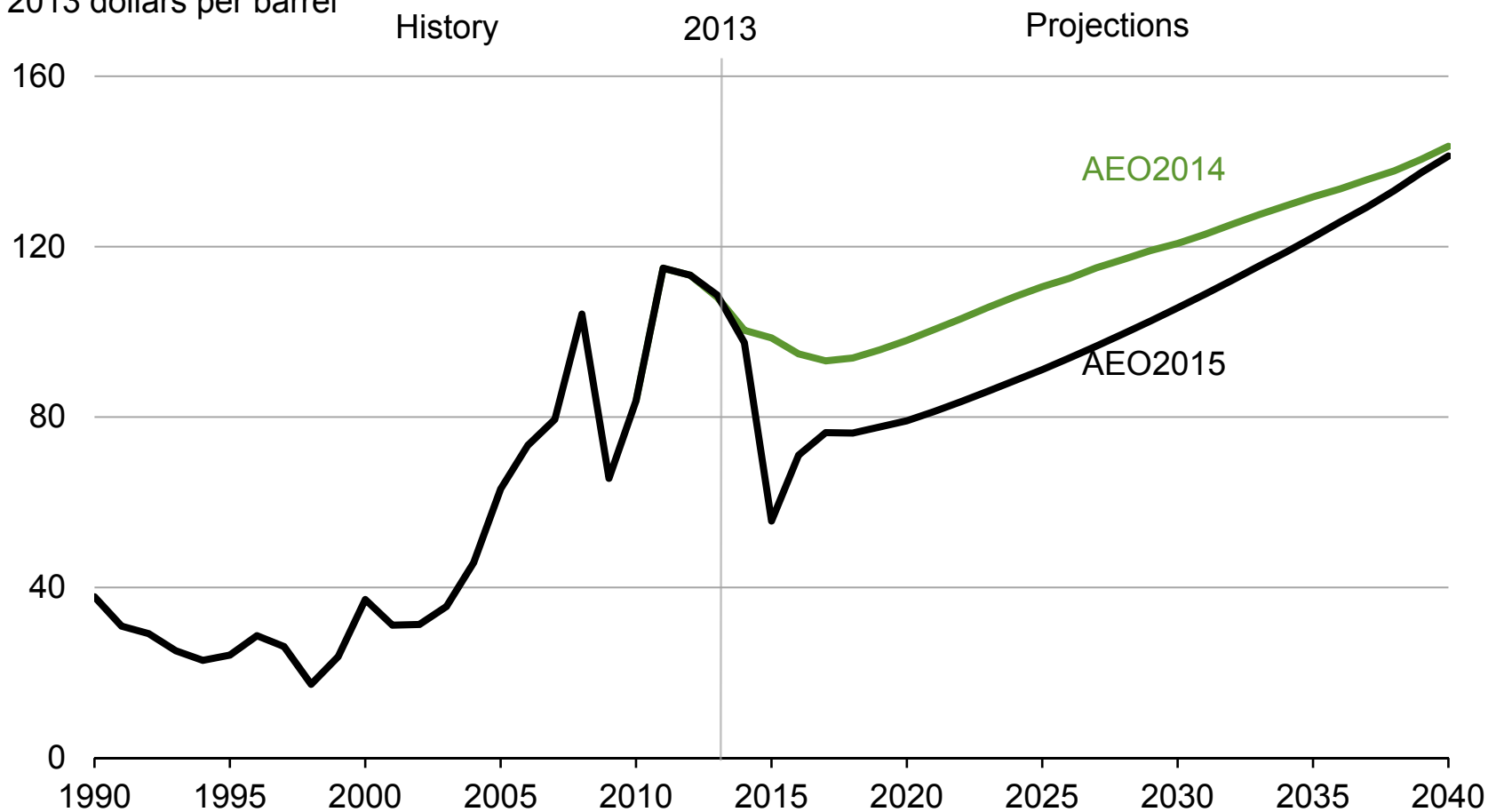
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# Annual Energy Outlook 2015: Petroleum and other liquid supply

<http://www.eia.gov/forecasts/aeo/>

# Crude oil price projection is lower in the AEO2015 Reference case than in AEO2014, particularly in the near term

Brent crude oil spot price  
2013 dollars per barrel

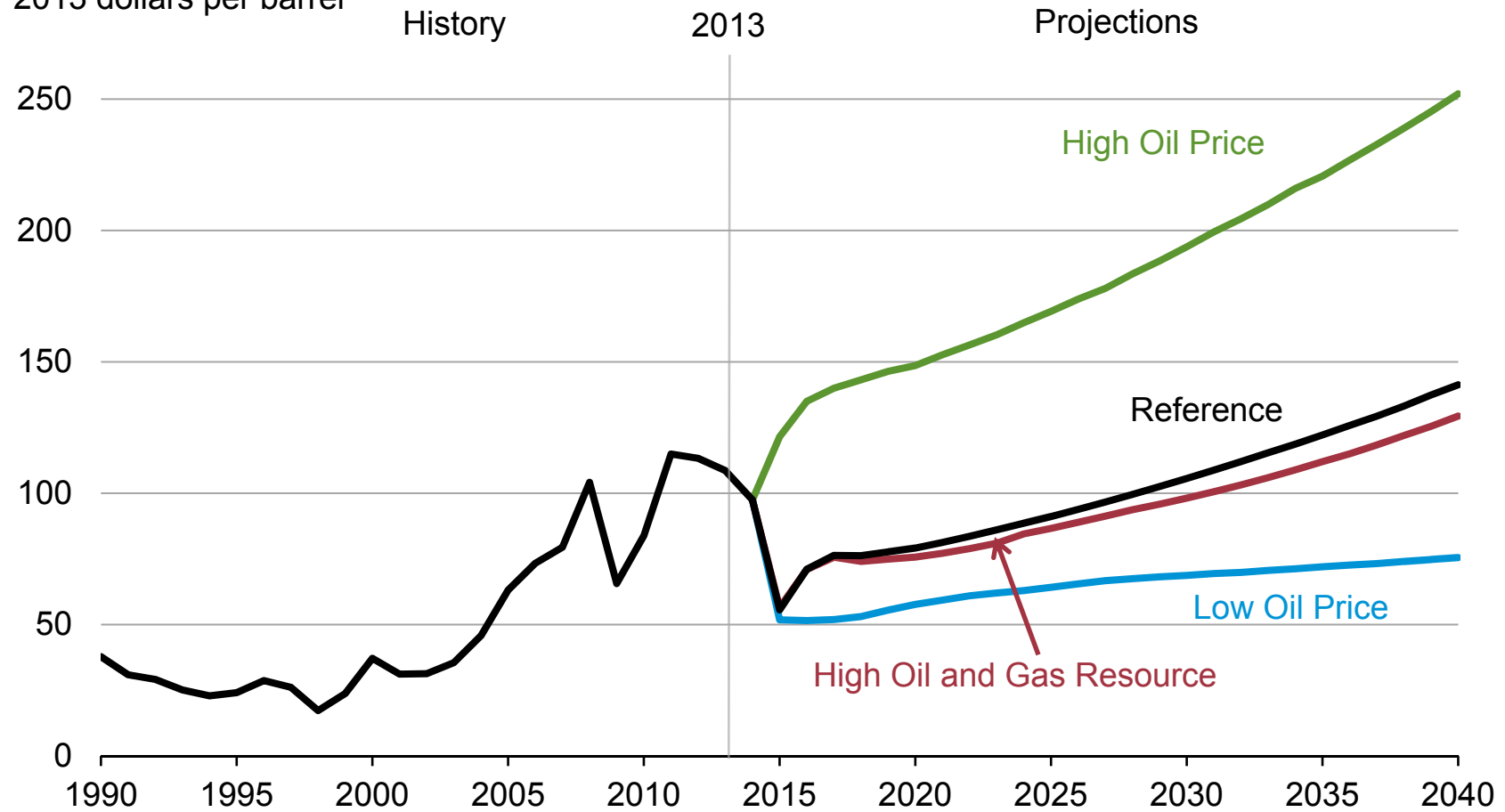


Source: EIA, Annual Energy Outlook 2015 Reference case and Annual Energy Outlook 2014 Reference case



# AEO2015 explores scenarios that encompass a wide range of future crude oil price paths

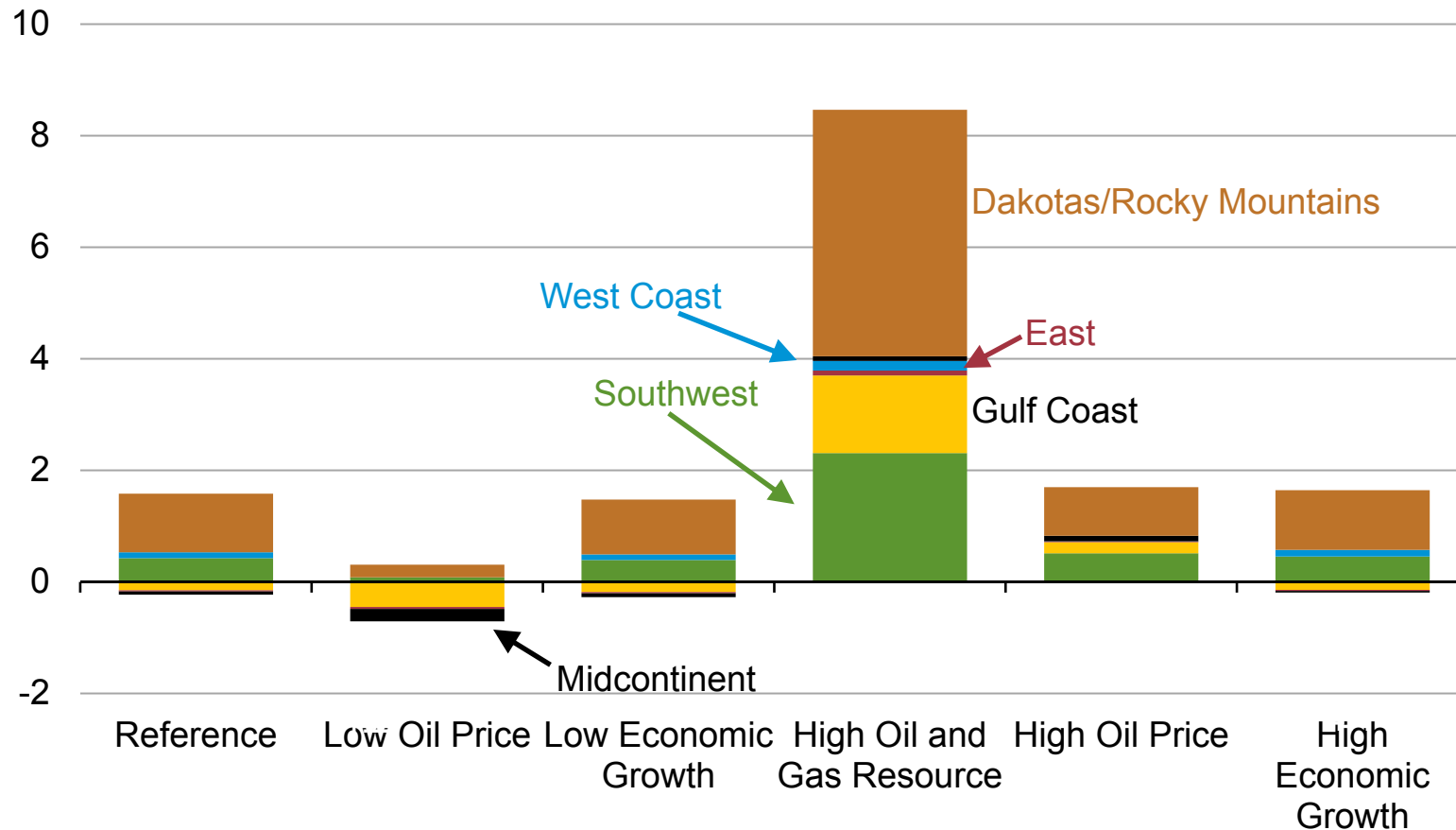
Brent crude oil spot price  
2013 dollars per barrel



Source: EIA, Annual Energy Outlook 2015

# Growth of onshore crude oil production varies across supply regions, affecting pipeline and midstream infrastructure needs

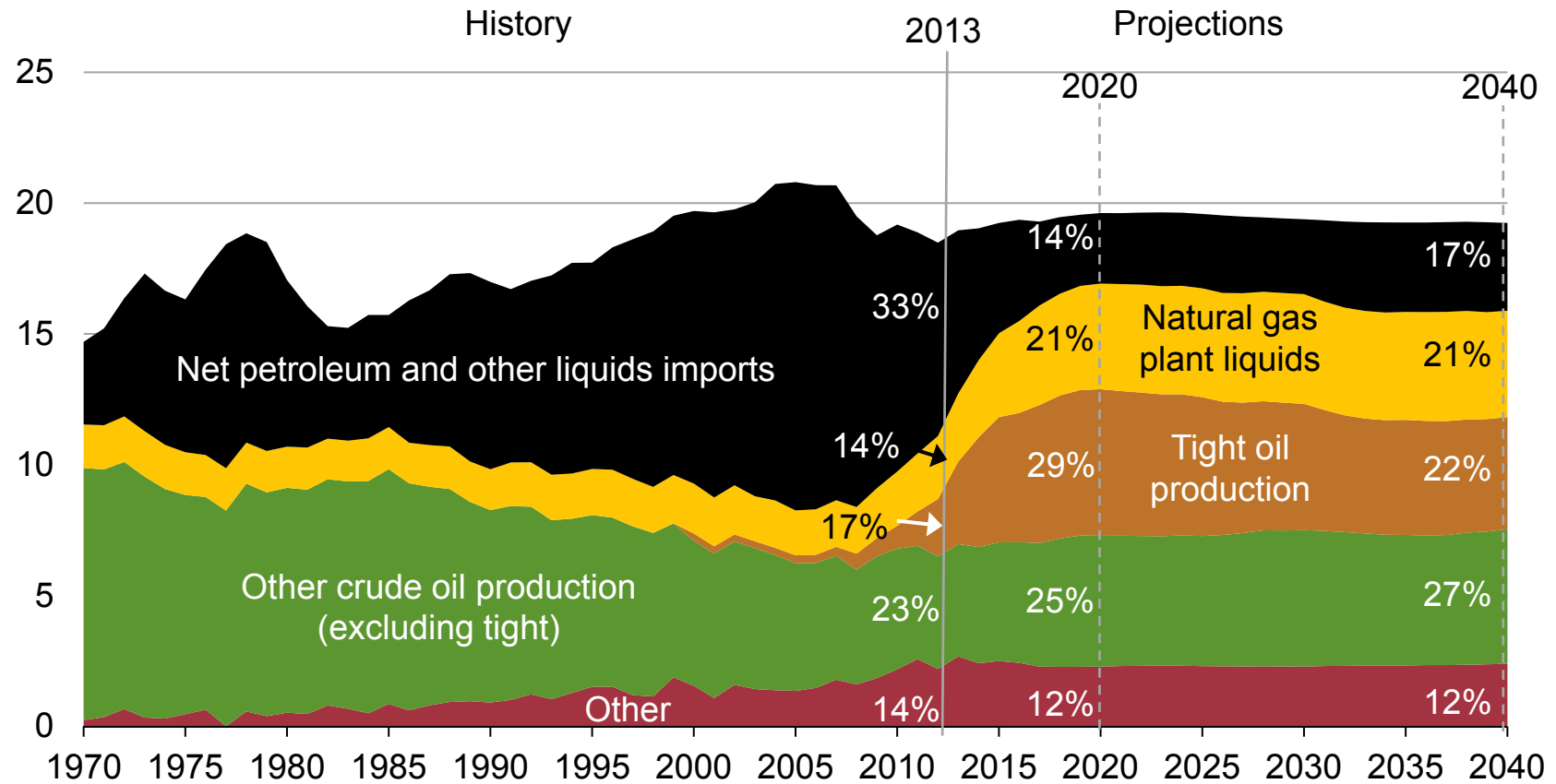
change between 2013 and 2040 in U.S. lower 48 onshore crude oil production by region  
million barrels per day



Source: EIA, Annual Energy Outlook 2015

# Combination of increased tight oil production and higher fuel efficiency drive projected decline in oil imports

U.S. liquid fuels supply  
million barrels per day

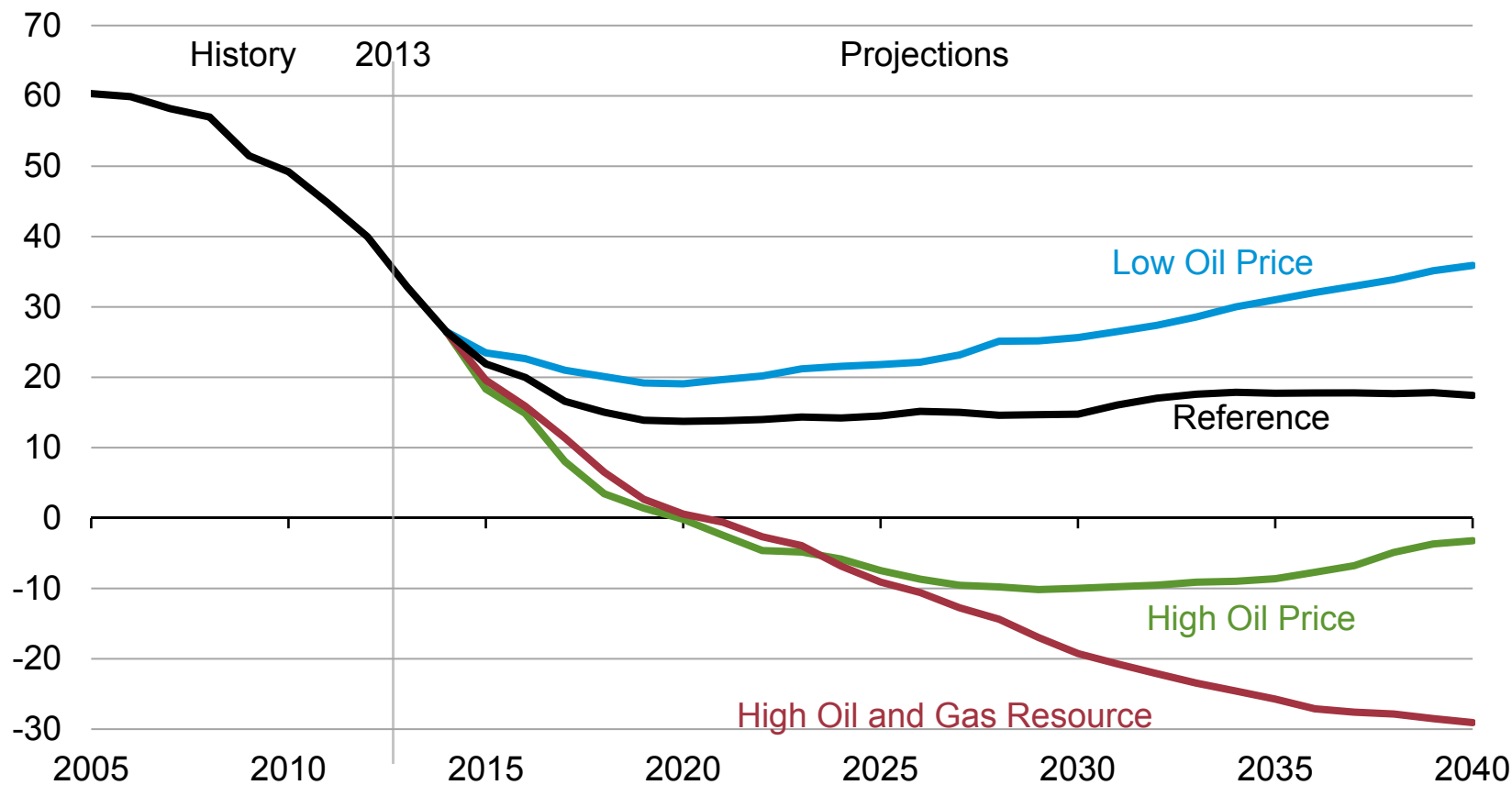


Note: "Other" includes refinery gain, biofuels production, all stock withdrawals, and other domestic sources of liquid fuels

Source: EIA, Annual Energy Outlook 2015 Reference case

# Net imports provide a declining share of U.S. liquid fuels supply in most AEO2015 cases; in two cases the nation becomes a net exporter

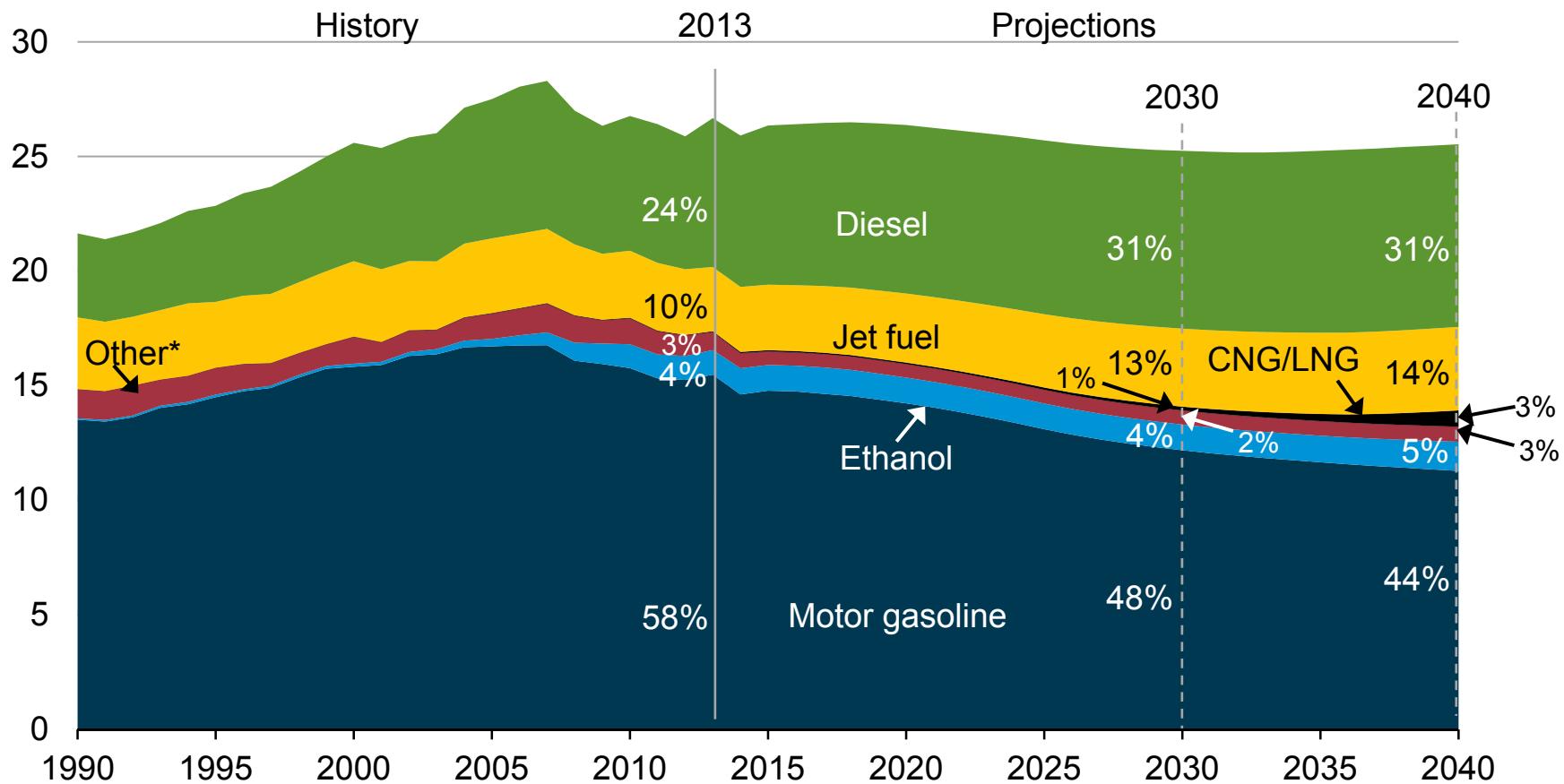
net crude oil and petroleum product imports as a percentage of total U.S. supply  
percent



Source: EIA, Annual Energy Outlook 2015

# In the transportation sector, motor gasoline use declines; diesel fuel, jet fuel, and natural gas use all grow

transportation energy consumption by fuel  
quadrillion Btu

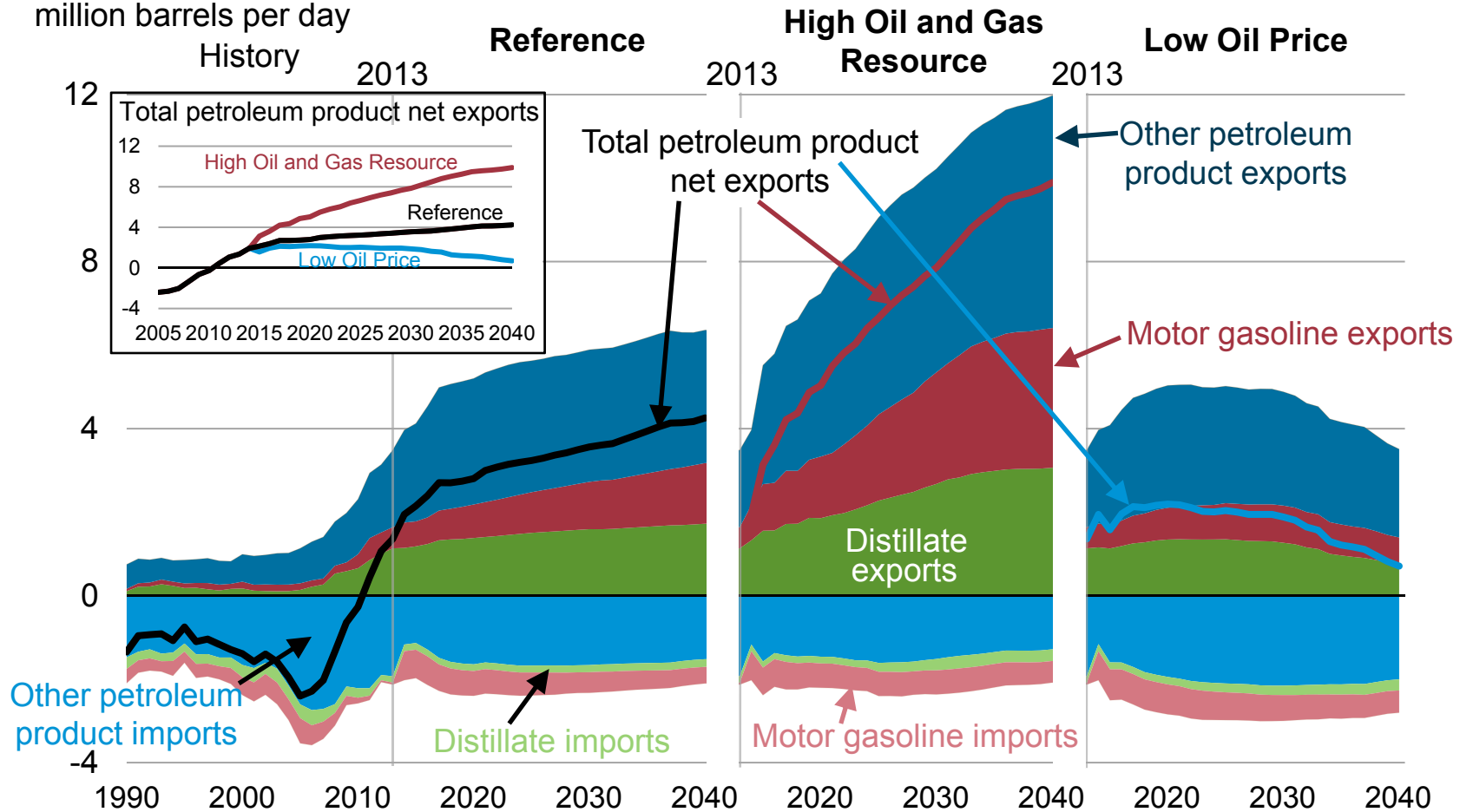


Source: EIA, Annual Energy Outlook 2015 Reference case

\*Includes aviation gasoline, propane, residual fuel oil, lubricants, electricity, and liquid hydrogen

# U.S. net exports of petroleum products vary with the level of domestic oil production given current limits on U.S. crude oil exports

U.S. petroleum product imports and exports  
million barrels per day



Source: EIA, Annual Energy Outlook 2015



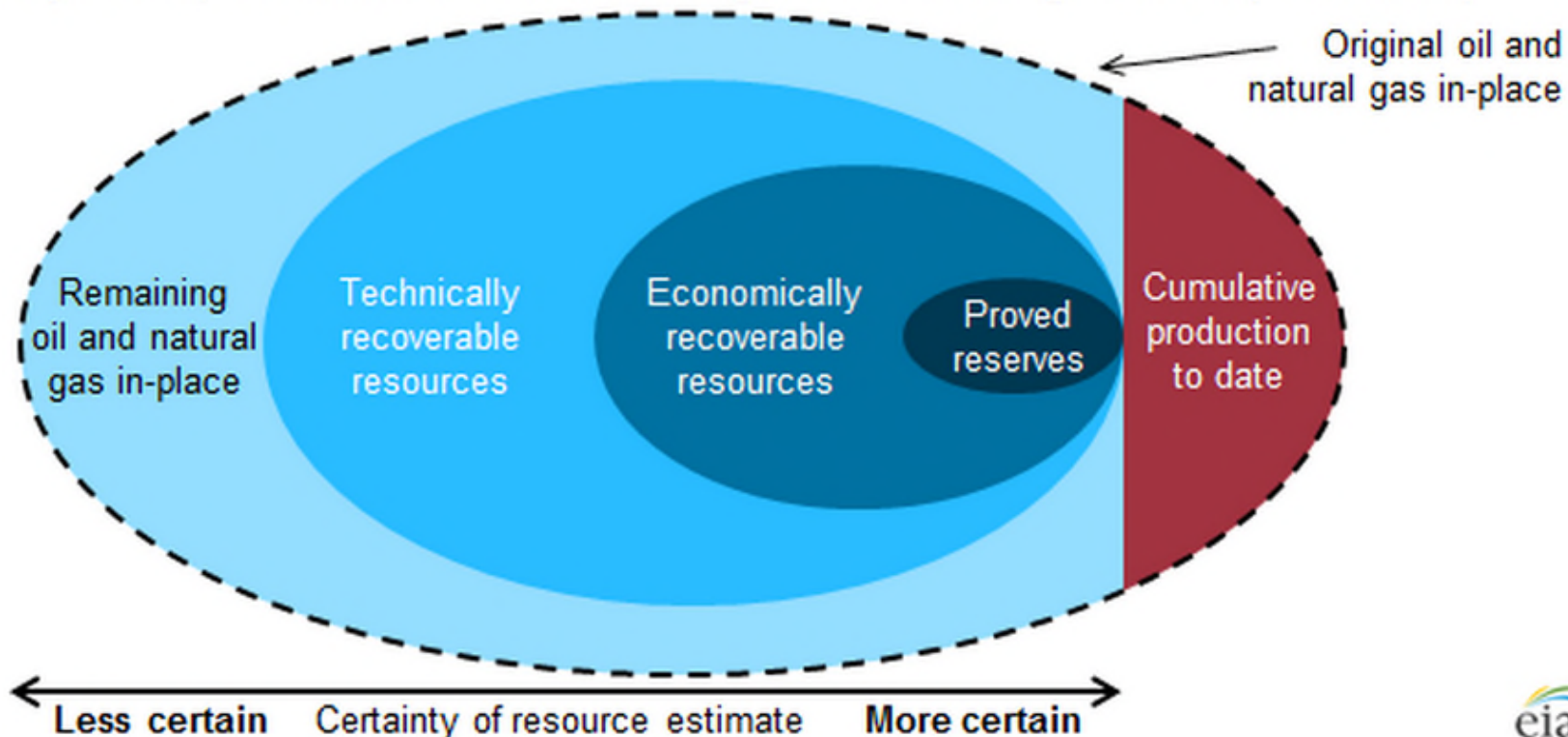
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# Tight Oil Abroad



# Oil and natural gas resource categories reflect varying degrees of certainty

Stylized representation of oil and natural gas resource categorizations (not to scale)

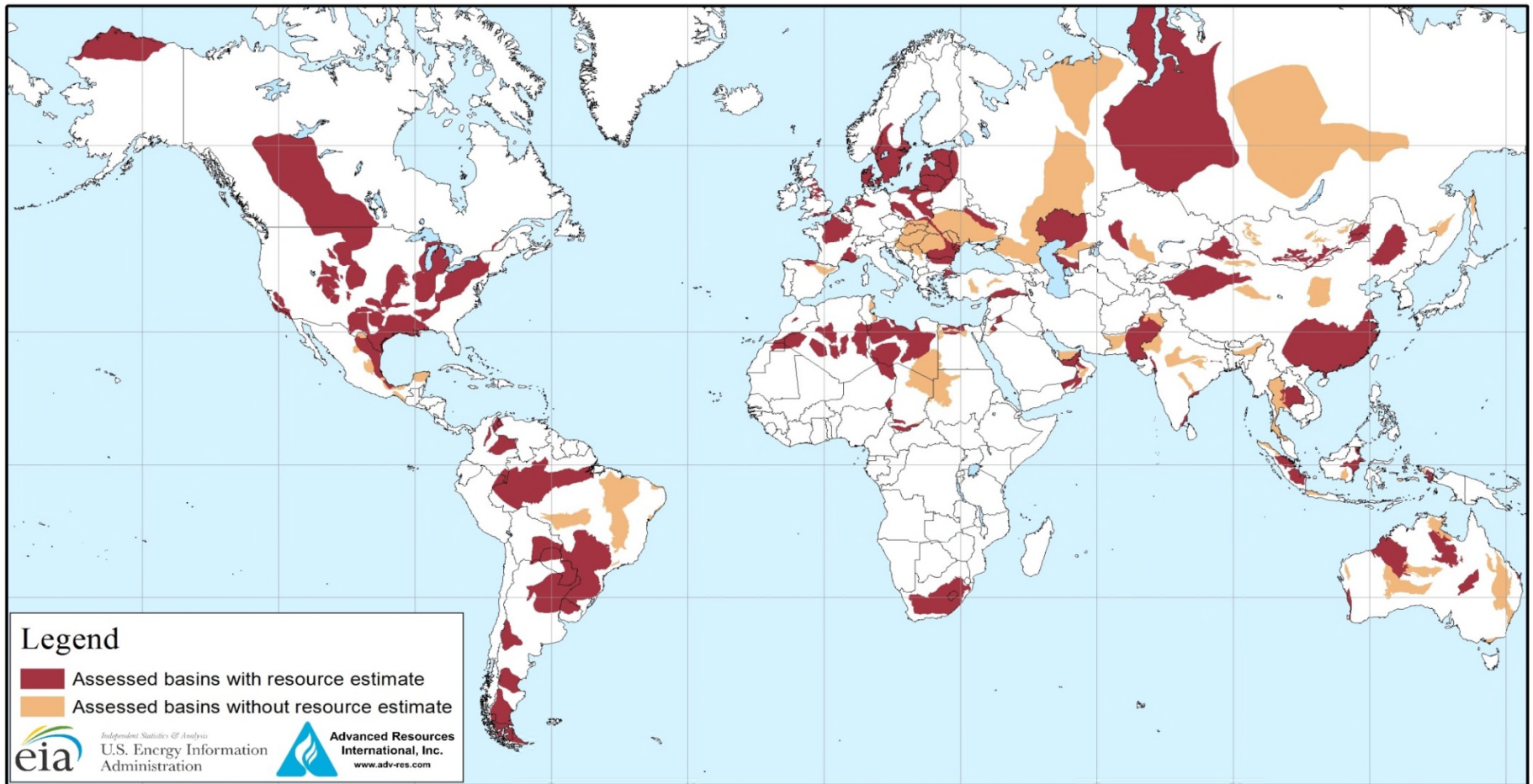


Source: U.S. Energy Information Administration

Note: Resource categories are not drawn to scale relative to the actual size of each resource category. The graphic shown above is applicable only to oil and natural gas resources.

<http://www.eia.gov/todayinenergy/detail.cfm?id=17151>

# Map of 106 basins assessed for shale oil and shale gas resources in 46 countries



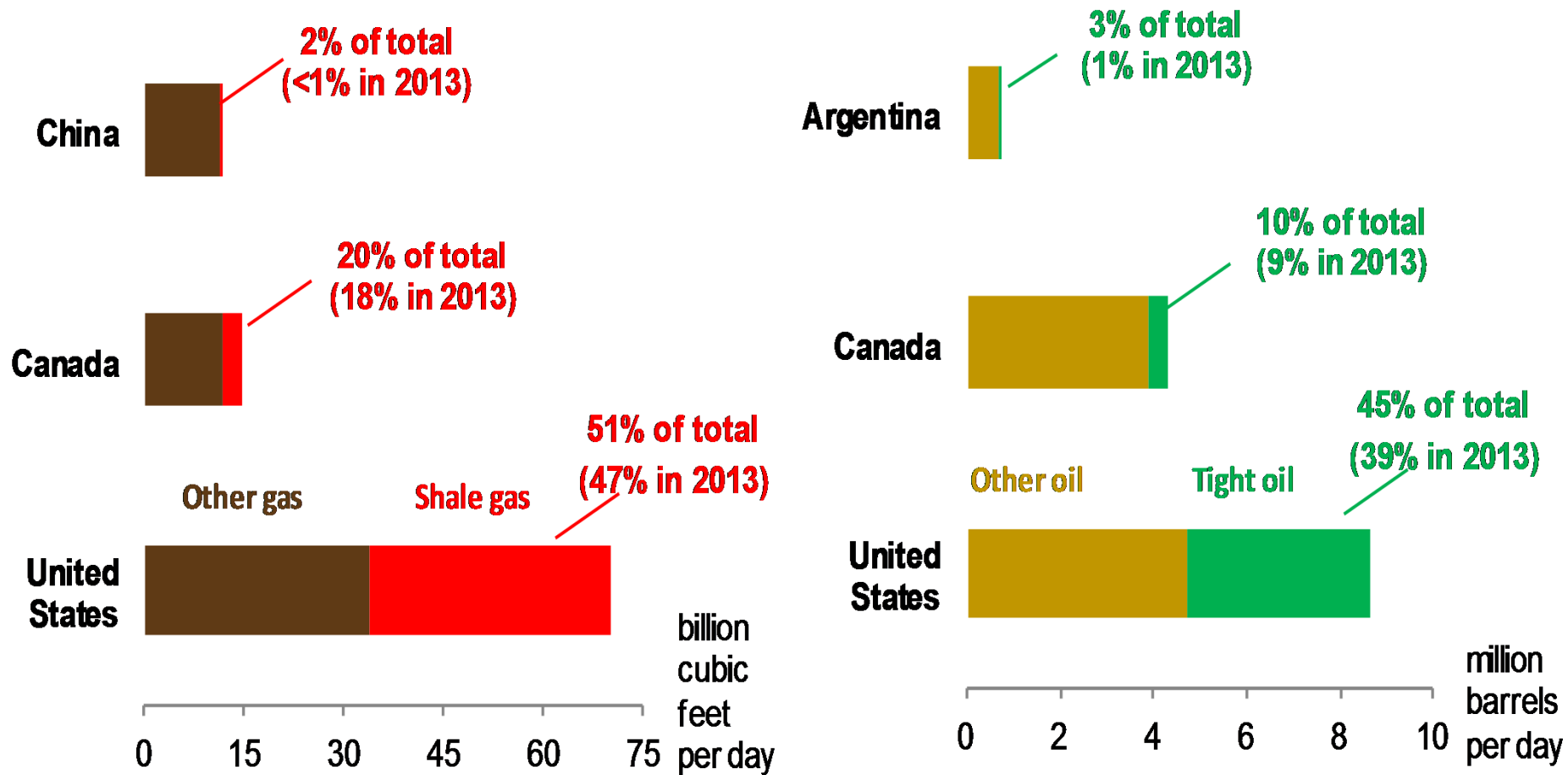
Source: EIA/ARI Supplement 2015 Preliminary Release

## Top ten countries with technically recoverable shale resources

Shale gas			Shale oil		
Rank	Country	Trillion cubic feet	Rank	Country	Billion barrels
1	China	1,115	1	Russia	75.8
2	Argentina	802	2	United States	60.2
3	Algeria	707	3	China	32.2
4	Canada	573	4	Argentina	27.0
5	United States	555	5	Libya	26.1
6	Mexico	545	6	UAE	22.6
7	Australia	429	7	Chad	16.2
8	South Africa	390	8	Australia	15.6
9	Russia	287	9	Venezuela	13.4
10	Brazil	245	10	Mexico	13.1
	<b>Total for 46 countries</b>	<b>7,509</b>		<b>Total for 46 countries</b>	<b>400.8</b>

Source: EIA, USGS and ARI 2015 Preliminary Results

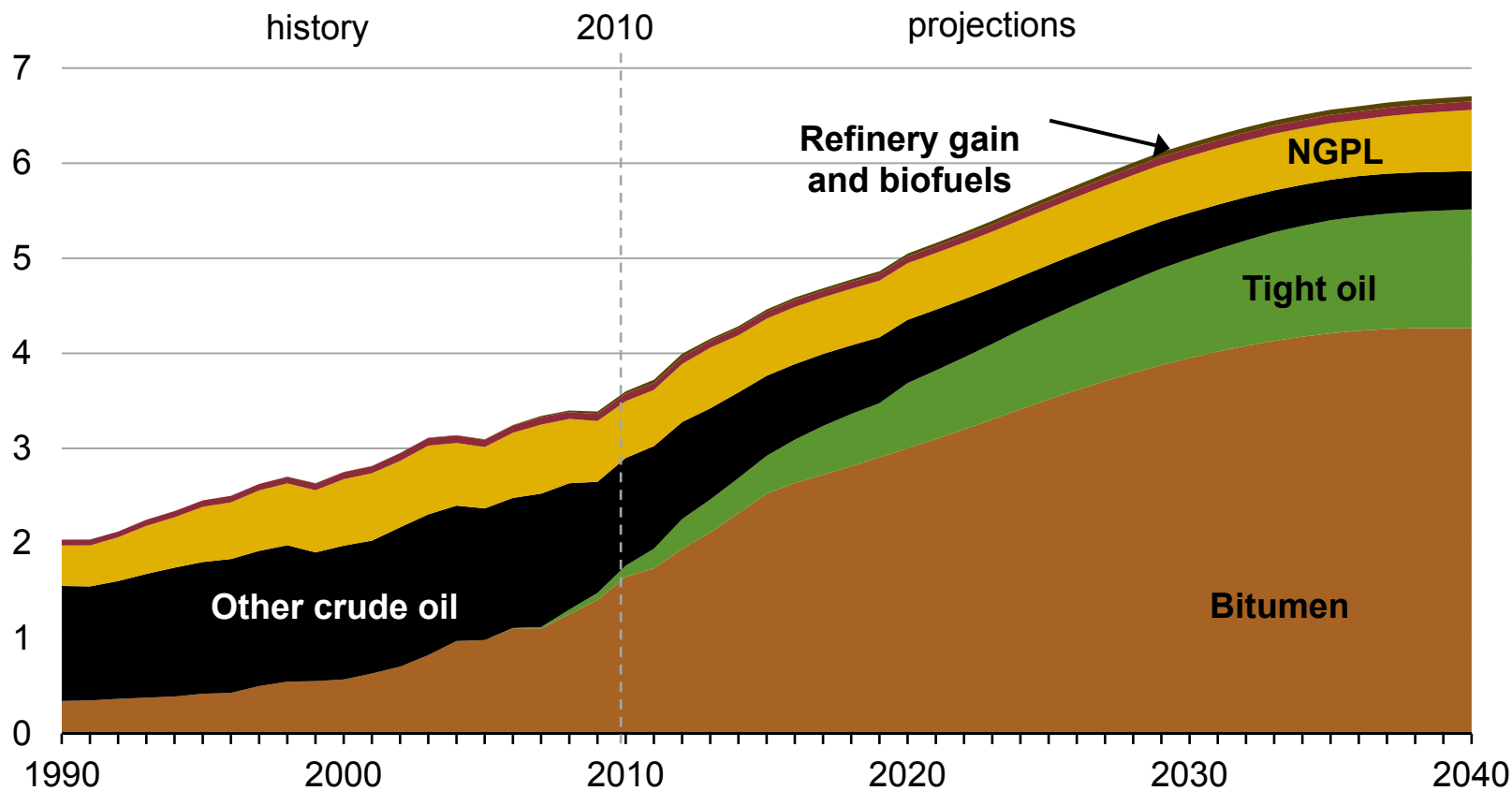
# Countries producing shale gas and tight oil in 2014



Source: US EIA, Canada National Energy Board, Fact Global Energy, Chevron, Yacimientos Petroliferos Fiscales

# Canadian liquids production

Canadian liquid fuels production, Reference case  
million barrels per day



Source: EIA, International Energy Outlook 2014