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U.S. Energy Information  
Administration

# U.S. Crude Oil and Natural Gas Proved Reserves, Year-End 2017

November 2018



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## U.S. Crude Oil and Natural Gas Proved Reserves, Year-End 2017

Stronger oil and natural gas prices combined with continuing development of shales and low permeability formations drove producers of crude oil and natural gas in the United States to report new all-time record levels of proved reserves for both fuels in 2017. Total U.S. oil reserves in 2017 exceeded a brief, one-year, 47-year-old record, highlighting the importance of crude oil development in shales and low permeability plays, mainly in the Southwest. The new record for natural gas extends a longer-term trend of development, mainly in shale plays in the Northeast. Both U.S. proved reserves of crude oil and natural gas are approximately double their levels from a decade ago. These new proved reserves records were established in 2017 despite production of crude oil at levels not seen since 1972, and record natural gas production.

Highlights are listed below.

### Oil highlights

- Proved reserves of crude oil in the United States increased 19.5% (6.4 billion barrels) to 39.2 billion barrels at Year-End 2017, setting a new U.S. record for crude oil proved reserves. The previous record was 39.0 billion barrels set in 1970.
- Proved reserves of lease condensate in the United States increased 16% (0.4 billion barrels) to 2.8 billion barrels at Year-End 2017. Since 2009, to provide a clearer picture of U.S. liquid fuel resources, EIA features combined proved reserves of U.S. crude oil and lease condensate in its reporting.
- U.S. production of crude oil and lease condensate increased by 6% from 2016 to year-end 2017. Crude oil production in 2017 reached its highest level since 1972.
- The annual average spot price for a barrel of West Texas Intermediate (WTI) crude oil at Cushing, Oklahoma increased 20% in 2017, from \$42.59 in 2016 to \$51.03. At the end of 2017, the WTI spot price exceeded \$60 per barrel for the first time since June 2015.
- Producers in Texas added 3.3 billion barrels of crude oil and lease condensate proved reserves, the largest net increase of all states in 2017. The increase was a result of increased prices and development in the Permian Basin of the Spraberry Trend and the Wolfcamp/Bone Spring shale play.
- The Wolfcamp/Bone Spring shale play in the Permian Basin surpassed the Bakken/Three Forks play in the Williston Basin to become the largest oil-producing tight play in the United States in 2017.
- The next largest net gains in crude oil and lease condensate proved reserves in 2017 were in New Mexico (1.0 billion barrels) and in the Federal Offshore Gulf of Mexico (729 million barrels).

### Natural gas highlights

- Proved reserves of natural gas increased by 123.2 trillion cubic feet (Tcf) (36.1%) to 464.3 Tcf at year-end 2017—a new U.S. record for total natural gas proved reserves. The previous U.S. record was 388.8 Tcf, set in 2014.
- U.S. production of total natural gas increased by 4% from 2016 to 2017, reaching a new record level.
- The share of natural gas from shale compared with total U.S. natural gas proved reserves increased from 62% in 2016 to 66% at year-end 2017.
- The annual average spot price for natural gas at the Louisiana Henry Hub increased by 21% from \$2.47 per million British thermal units (MMBtu) in 2016 to \$2.99 per MMBtu in 2017.

- Producers in Pennsylvania added 28.1 Tcf of natural gas proved reserves, the largest net increase of all states in 2017, as a result of increased prices and development of the Marcellus and Utica shale plays.
- The next largest net gains in natural gas proved reserves by volume in 2017 were in Texas (26.9 Tcf) and Louisiana (18.4 Tcf) as a result of development of the Wolfcamp/Bone Spring shale play in the Permian Basin and the Haynesville/Bossier shale play in eastern Texas and northern Louisiana.

*Proved reserves* are estimated volumes of hydrocarbon resources that analysis of geologic and engineering data demonstrates with reasonable certainty<sup>1</sup> are recoverable under existing economic and operating conditions. Reserves estimates change from year to year as new discoveries are made, as existing fields are thoroughly appraised, as existing reserves are produced, as prices and costs change, and technologies evolve.

To develop this report, EIA collects independently developed estimates of proved reserves from a sample of operators of U.S. oil and natural gas fields from its survey Form EIA-23L, and then estimates the non-reported portion of proved reserves. Responses were received from 412 of 418 sampled operators. Estimates are developed for the United States, each state, and state subdivisions. Within this report, EIA publishes proved reserves for state subdivisions within California, Louisiana, New Mexico, Texas, and the Federal Offshore Gulf of Mexico.

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<sup>1</sup> *Reasonable certainty* assumes a probability of recovery of 90% or greater.

## National summary

**Table 1. U.S. proved reserves and reserves changes, 2016–17**

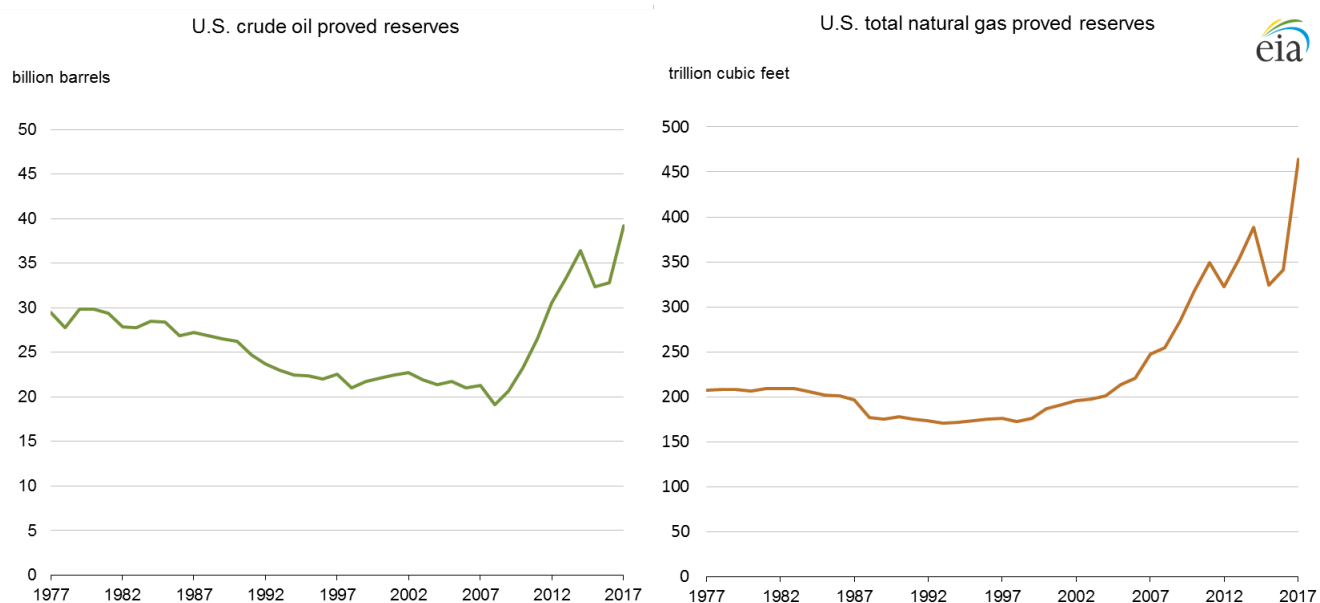
	Crude oil billion barrels	Crude oil and lease condensate billion barrels	Total natural gas trillion cubic feet
<b>U.S. proved reserves as of December 31, 2016</b>	<b>32.8</b>	<b>35.2</b>	<b>341.1</b>
Extensions and discoveries	5.1	5.7	70.8
Net revisions	2.6	2.7	41.3
Net adjustments, sales, acquisitions	1.8	1.8	41.4
Estimated Production	-3.2	-3.4	-30.4
<b>Net additions to U.S. proved reserves</b>	<b>6.4</b>	<b>6.8</b>	<b>123.2</b>
<b>U.S. proved reserves as of December 31, 2017</b>	<b>39.2</b>	<b>42.0</b>	<b>464.3</b>
<b>Percent change in U.S. proved reserves</b>	<b>19.5%</b>	<b>19.2%</b>	<b>36.1%</b>

Notes: Total natural gas includes natural gas plant liquids. Columns may not add to total because of independent rounding.

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

Both U.S. proved reserves of crude oil and natural gas are approximately double their levels from a decade ago. Prior to 1997, natural gas and crude oil reserves had been declining since the 1970s (Figure 1). In 1997, the downward trend for natural gas reversed because of innovations in horizontal drilling and hydraulic fracturing techniques that successfully increased natural gas proved reserves and production from shale formations. In 2008, the downward trend for crude oil reversed when innovations in horizontal drilling and hydraulic fracturing were applied to tight oil-bearing formations, such as the Bakken Shale of the Williston basin. The upward trends have continued, and both crude oil and natural gas proved reserves reached new U.S. record levels at Year-End 2017.

**Figure 1. U.S. crude oil and natural gas proved reserves, 1977–2017**



Sources: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves, 1977–2017*

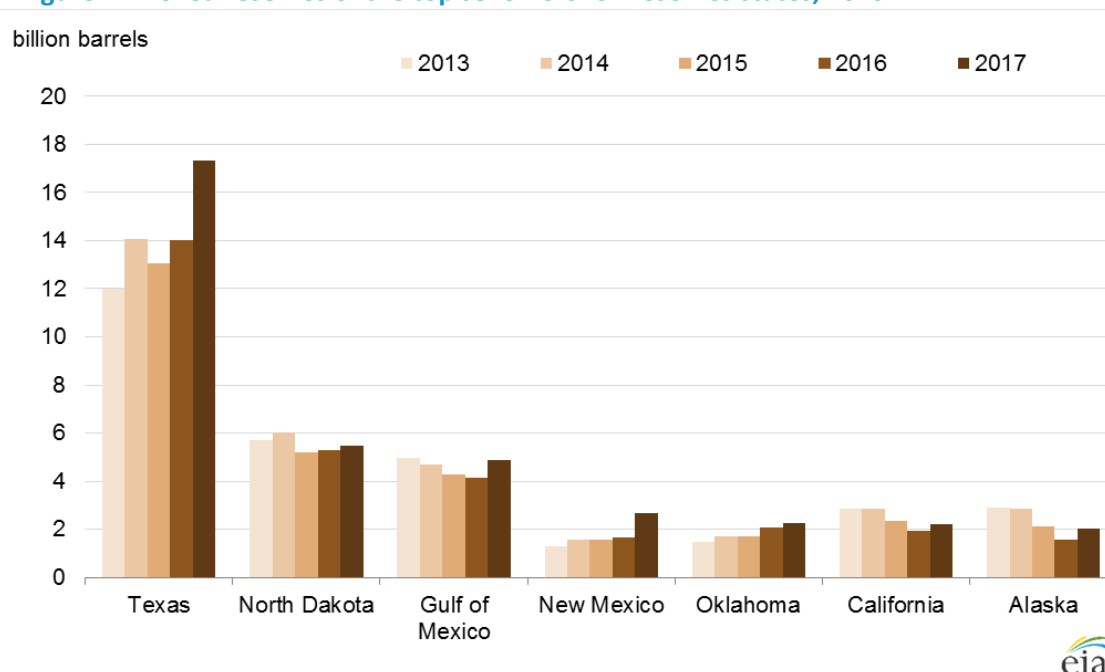
Proved reserves of combined crude oil and lease condensate increased in all of the top seven U.S. oil reserves states in 2017 (Figure 2). In 2017, Texas held the largest proved reserves of any state and saw the largest



volumetric increase—a net increase of 3.3 billion barrels of crude oil and lease condensate proved reserves from 2016 to 2017. Most reserves additions, largely due to additional drilling and exploration in previously discovered reservoirs, were made in the Spraberry Trend Area and Wolfcamp shale play in west Texas (Texas Railroad Commission Districts 8, 8A, and 7C). EOG Resources, Inc.—the largest oil producer in Texas<sup>2</sup>—attributed its success in the Wolfcamp shale play (Delaware Basin) in 2017 to lateral length extensions, precision targeting, high-density stimulations, and cost reductions. The average lateral length of completed wells in the play increased from approximately 5,200 feet in 2016 to approximately 6,100 feet in 2017. *Precision targeting* refers to advances in *logging while drilling* technology (both sensors and software) that have improved the real-time geosteering process of horizontal drilling,<sup>3</sup> allowing operators to identify the best rock and achieve precise wellbore placement within it. *High-density stimulations* (hydraulic fracturing) refers to an increase in the amount of perforation clusters per hydraulic fracturing stage and also the proppant load per lateral foot (more fractures, more proppant per fracture). EOG Resources cites in its *2017 Annual Report* that ownership of a sand mine and two sand processing centers in Hood County, Texas, was significant in reducing operating costs in 2017.

New Mexico had the second-largest proved reserves increase—a net addition of 1.0 billion barrels of crude oil and lease condensate proved reserves. Success in the Permian Basin (see above) also applied to Wolfcamp/Bone Springs shale play wells in eastern New Mexico. The third-largest net increase in proved reserves of crude oil and lease condensate was in the Federal Offshore Gulf of Mexico (GOM) at 729 million barrels. Producers brought seven new projects and expansions online in 2016 in the GOM and ramped up production in 2017. Another two projects came online in 2017<sup>4</sup>.

**Figure 2. Proved reserves of the top seven U.S. oil reserves states, 2013–17**



Notes: Oil reserves include crude oil and lease condensate. Gulf of Mexico represents the federally owned offshore portion of the Gulf of Mexico. Although not a state, it is an important U.S. oil and natural gas production area.

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves, 2013–17*

<sup>2</sup> As ranked by the Railroad Commission of Texas in its 2017 compilation of the top 32 oil and natural gas producers in Texas, February 15, 2018.

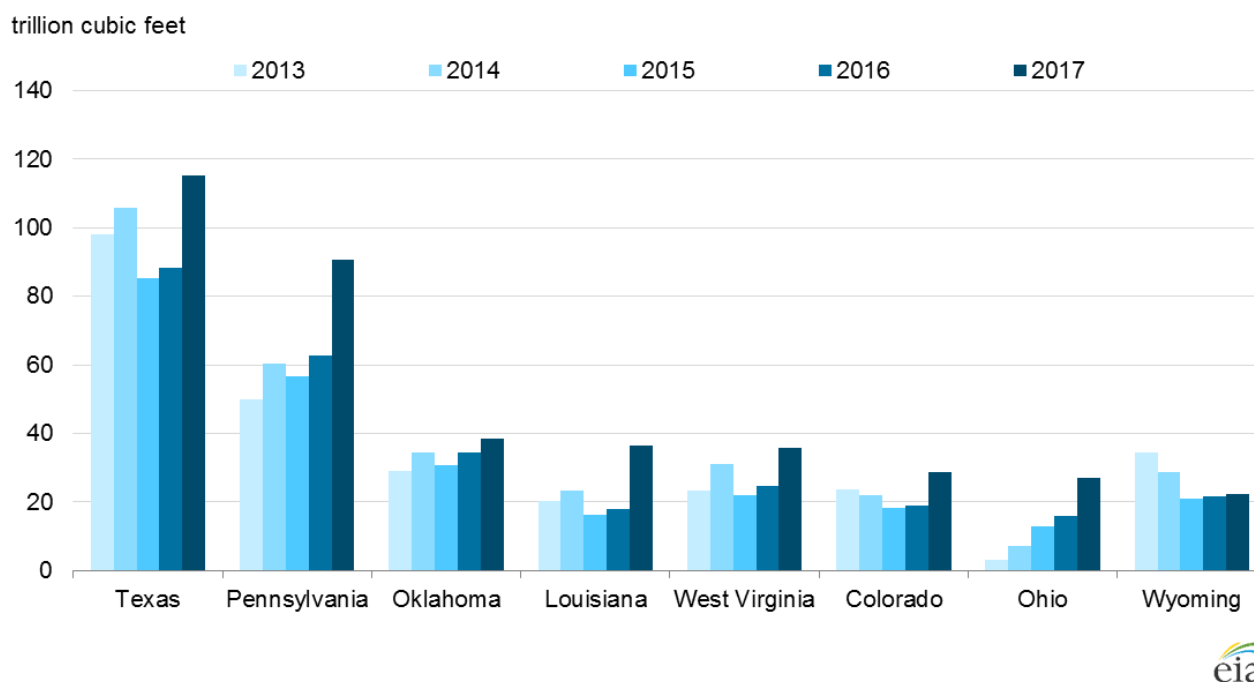
<sup>3</sup> Halliburton, “Targeting the Sweet Spot: Positioning the horizontal wellbore in the target zone for optimal production.”

<sup>4</sup> “U.S. Gulf of Mexico crude oil production to continue at record highs through 2019”, U.S. Energy Information Administration, *Today in Energy*, April 11, 2018.

Proved natural gas reserves increased in each of the top eight U.S. natural gas reserves states in 2017 (Figure 3). Pennsylvania had the largest net increase in proved natural gas reserves of any state, adding 28.1 Tcf of proved natural gas reserves in the Marcellus and Utica shale plays. EQT Corporation announced on December 13, 2017, that it had successfully completed the longest lateral by any operator in the Marcellus shale play—the Haywood H18 well in Washington County, Pennsylvania, has a completed lateral length of 17,400 feet (more than three miles)<sup>5</sup>—and that the company plans to drill 27 Marcellus wells at 17,000 feet or longer in 2018.

Texas had the second-largest net increase, adding 26.9 Tcf of proved natural gas reserves—the largest portion of the increase came from associated-dissolved natural gas proved reserves that accompanied the gains in crude oil proved reserves in the Permian Basin. The third-largest net increase in proved natural gas reserves was in Louisiana, where operators added 18.4 Tcf of proved reserves developing the Haynesville/Bossier shale play.

**Figure 3. Proved reserves of the top eight U.S. natural gas reserves states, 2013–17**



Note: Total natural gas includes natural gas plant liquids that have yet to be extracted downstream and does not include lease condensate.

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves, 2013–17*

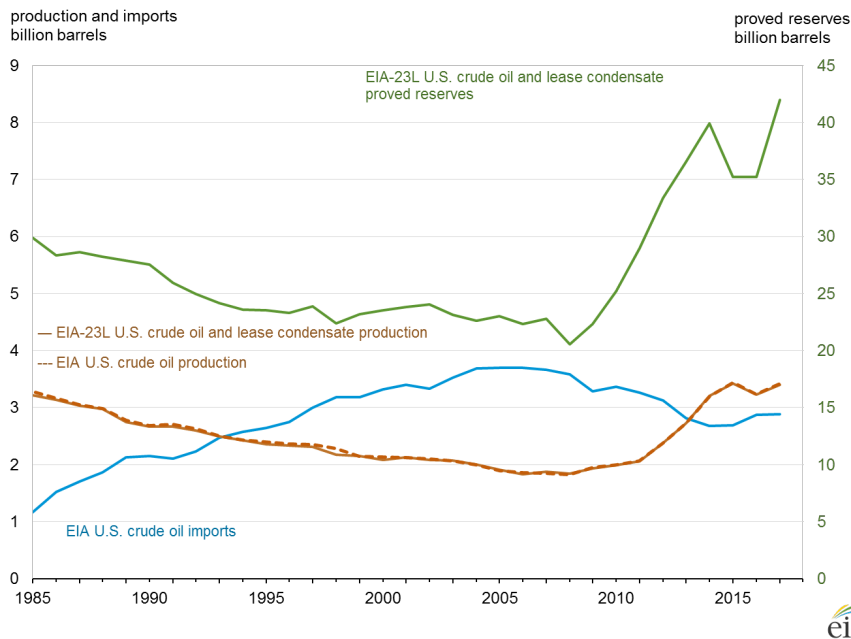
#### Official EIA oil and natural gas production data

EIA's official production volumes are published in the *Petroleum Supply Annual 2017*, DOE/EIA-0340(17) and the *Natural Gas Annual 2017*, DOE/EIA-0131(17) and are based on the EIA-914 report. The production numbers in the tables and figures of this report are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, and are used because they are consistent with EIA's calculations of U.S. reserves. The data may differ from EIA's official production numbers and are offered here as an indicator of production trends. Hence, they should not be cited as EIA's official production statistics.

<sup>5</sup> "EQT Announces 2018 Operational Forecast", EQT Investor Relations, Pittsburgh, Pennsylvania, December 13, 2017.

In 2017, U.S. crude oil and lease condensate production increased 178 million barrels (6%) from 2016 production, and imports of crude oil increased 35 million barrels (1%) from the 2016 level (Figure 4).

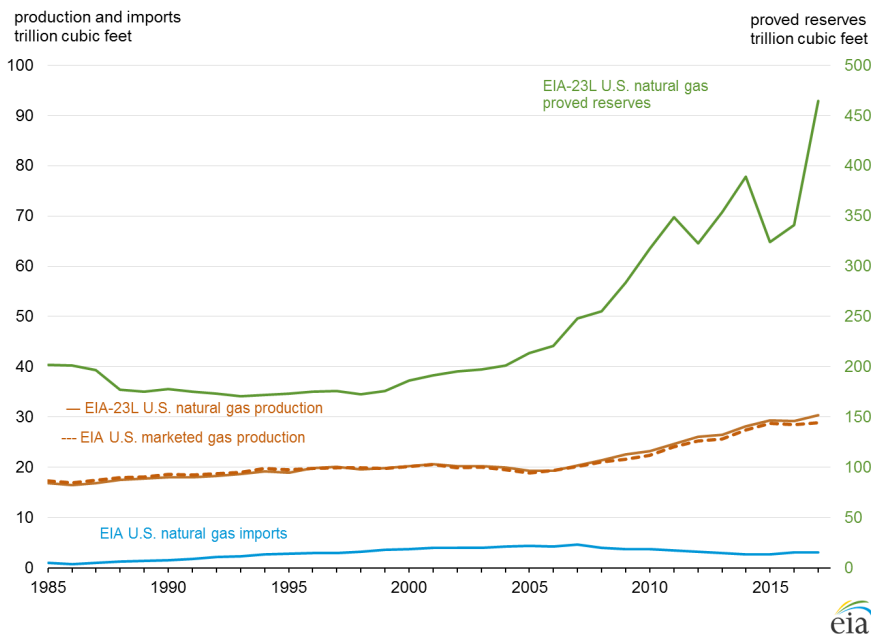
**Figure 4. U.S. crude oil and lease condensate proved reserves, production, and imports, 1985–2017**



Sources: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*; Form EIA-814, *Monthly Imports Report*; *Petroleum Supply Annual 2017*, DOE/EIA-0340(17)

U.S. natural gas production increased 4% (1.2 Tcf) in 2017, and natural gas imports increased 36 Bcf (1%) from the 2016 level (Figure 5).

**Figure 5. U.S. total natural gas proved reserves, production, and imports, 1985–2017**



Sources: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*; U.S. Department of Energy, Office of Fossil Energy, *Natural Gas Imports and Exports*; *Natural Gas Annual 2017*, DOE/EIA-0131(17)

## Background

This report provides estimates of U.S. proved reserves of crude oil and lease condensate and proved reserves of natural gas at the end of 2017. Changes for 2017 are measured as the difference between Year-End 2016 and Year-End 2017 estimates. EIA starts with the data filed on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, which was submitted by 412 of the 418 sampled operators of U.S. oil and natural gas fields. EIA then estimates the non-reported portion of proved reserves for the United States, each state, and state subdivisions. *State subdivisions* (e.g., California Coastal Region Onshore, Louisiana North, Texas Railroad Commission District 1) are defined geographic areas within a large producing state or offshore area. State subdivision boundaries typically align with the boundaries of internal state conservation commission districts that collect production data. Within this report, EIA publishes proved reserves for state subdivisions of California, Louisiana, New Mexico, Texas, and the Federal Offshore Gulf of Mexico.

Proved reserves are estimated volumes of hydrocarbon resources that analysis of geologic and engineering data demonstrates with reasonable certainty are recoverable under existing economic and operating conditions. Reserves estimates change from year to year as new discoveries are made, as existing fields are more thoroughly appraised, as existing reserves are produced, as prices and costs change, and as technologies evolve.

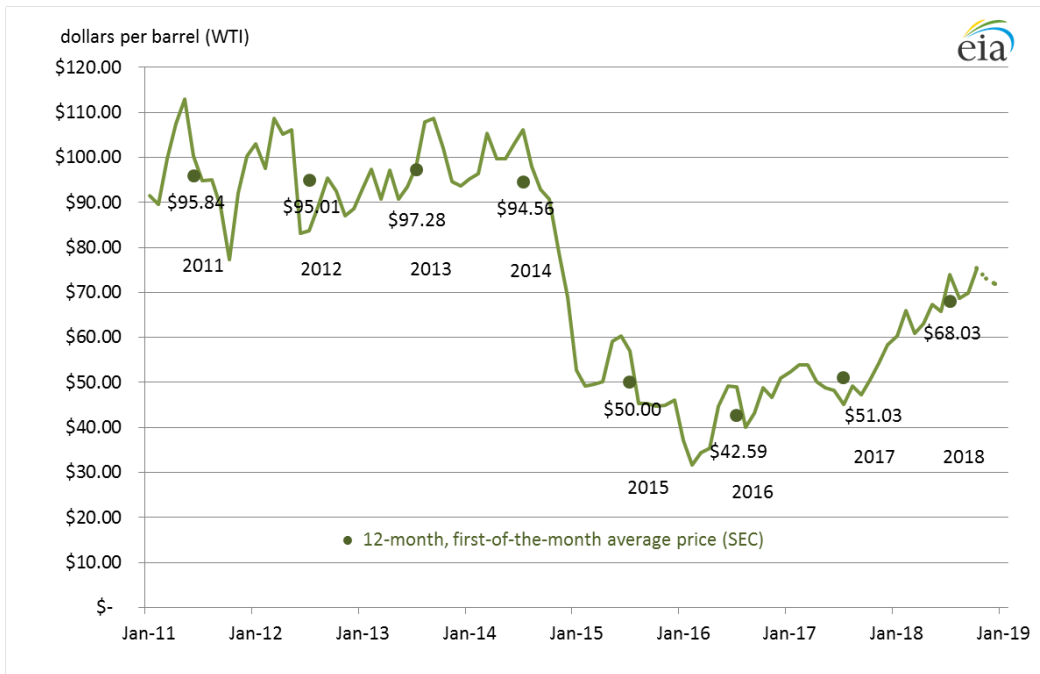
Discoveries include new fields, identification of new reservoirs in previously discovered fields, and additions to reserves that resulted from additional drilling and exploration in previously discovered reservoirs (extensions). Extensions are typically the largest percentage of total discoveries. New fields and reservoirs generally account for only a small percentage of overall annual reserve additions. Beginning with the 2016 report, operators reported to EIA on Form EIA-23L their discoveries as a single, combined category, *extensions and discoveries*, and totals for that category are presented in one column on the data tables in this report.

Revisions primarily occur when operators change their estimates of what they will be able to produce from the properties they operate in response to changing prices or improvements in technology. Higher fuel prices typically increase estimates (create positive revisions) as operators consider a broader portion of the resource base economically producible with reasonable certainty, or proved. Lower prices, on the other hand, generally reduce estimates (create negative revisions) as the economically producible base diminishes.

The 2017 reporting period is the ninth year companies reporting to the U.S. Securities and Exchange Commission (SEC) followed revised rules for determining the prices underpinning their proved reserves estimates. Designed to make estimates less sensitive to price fluctuations, the SEC rules require companies to use an average of the 12 first-day-of-the-month prices. EIA requires companies to follow the same procedure. (SEC and EIA estimates are not exactly the same, however; the SEC requires companies to report their owned reserves and EIA requires companies to report their operated reserves.)

Spot market prices are not necessarily the prices used by operators in their reserve estimates for EIA, because actual prices received by operators depend on their particular contractual arrangements, location, hydrocarbon quality, and other factors. However, spot prices do provide a benchmark or trend indicator. The 12-month, first-day-of-the-month average WTI crude oil spot price for 2017 was \$51.03 per barrel, up 20% from 2016 (Figure 6).

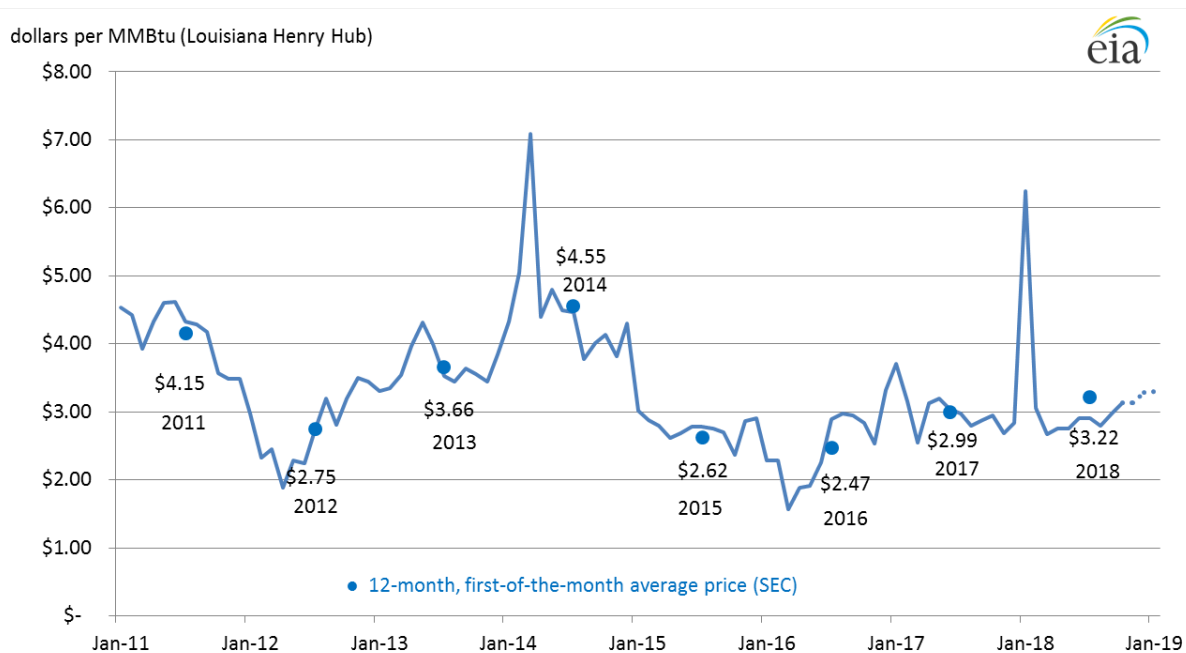
**Figure 6. WTI crude oil spot prices, first day of the month, 2011–18**



Note: November 1 and December 1, 2018 price forecasts are taken from EIA’s *Short-Term Energy Outlook*, October 10, 2018.  
 Source: Thomson Reuters, U.S. Energy Information Administration

The 12-month, first-day-of-the-month average natural gas spot price at Louisiana’s Henry Hub (the U.S. benchmark location for natural gas) for 2017 was \$2.99 per MMBtu, a 21% increase from the previous year’s average spot price of \$2.47 per MMBtu (Figure 7). In January 2018, a price spike of \$6.24 per MMBtu was observed, but prices declined the following month.

**Figure 7. Henry Hub natural gas spot prices, first day of the month, 2011–18**



Note: November 1 and December 1, 2018 price forecasts are taken from EIA’s *Short-Term Energy Outlook*, October 10, 2018.  
 Source: Thomson Reuters, U.S. Energy Information Administration

**Proved Reserves Outlook for EIA's next report (2018).** At the start of 2018, the [spot price of WTI crude oil](#) was at \$60 per barrel. The price level stayed in the \$60-\$70 range throughout most of 2018 but periodically rose higher than \$70 per barrel after May 2018. EIA forecasts in its most recent *Short-Term Energy Outlook*<sup>6</sup> that the price will remain above \$72 per barrel for the remainder of the year (November and December, 2018).

Compared with the 12-month, first-of-the-month 2017 average of \$51.03 per barrel, EIA's October *Short-Term Energy Outlook* projects that the 12-month, first-of-the-month 2018 average WTI spot oil price will increase 33% to \$68.03 per barrel. Consequently, upward revisions in U.S. crude oil proved reserves in 2018 are likely, even as production increases draw down proved reserves. The 12-month, first-of-the-month average natural gas spot price at the Henry Hub in Louisiana in 2017 was \$2.99 per MMBtu. EIA expects the average 12-month, first-of-the-month spot natural gas price at the Henry Hub to increase about 8% in 2018, to \$3.22 per MMBtu. Some net upward revisions in U.S. natural gas proved reserves can be expected in the 2018 reserves report, but record-setting levels like those in 2017 are not likely.

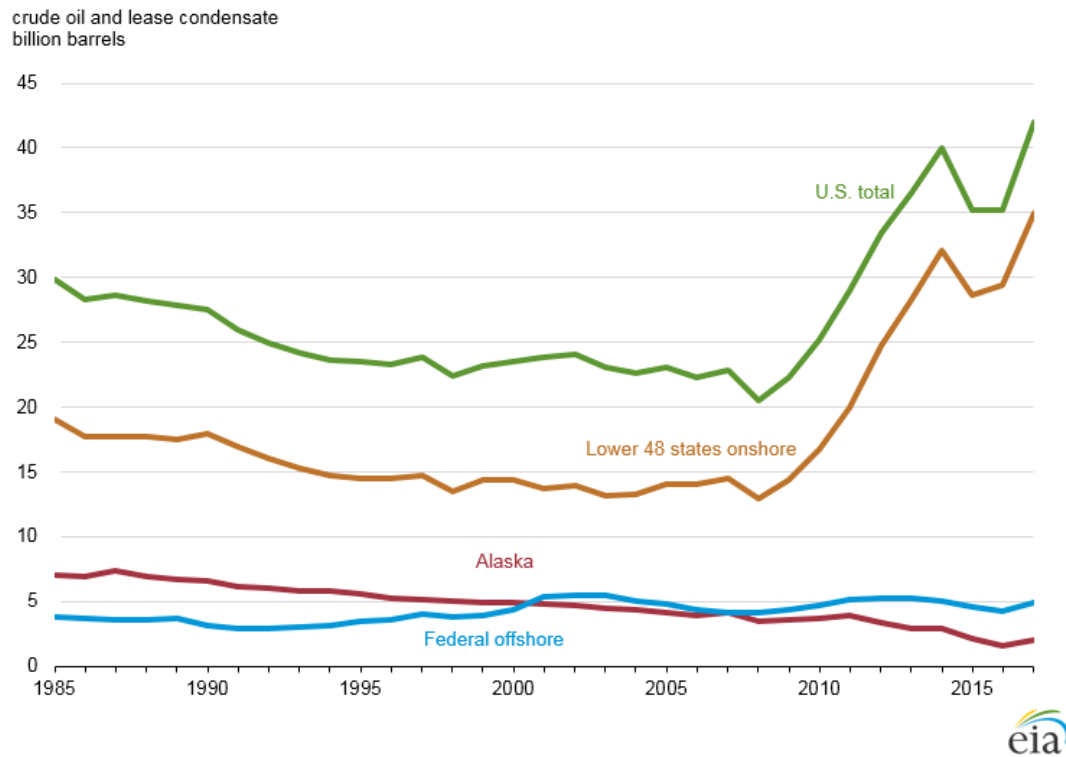
Throughout 2017, the [number of U.S. rotary rigs in operation](#) increased from 683 to 930<sup>7</sup>. Throughout most of 2018, this upward trend continued and the number of rotary rigs in operation now exceeds 1,000. This trend is expected to increase both crude oil and natural gas reserves in the 2018 reserves report because of more extensions and discoveries.

### Crude oil and lease condensate proved reserves

EIA estimates that the United States had 41,990 million barrels of crude oil and lease condensate proved reserves as of December 31, 2017—an increase of 19.2% from year-end 2016. Proved reserves rose 19% (5.6 billion barrels) onshore in the Lower 48 states (U.S. total not including Alaska, Federal Offshore (both Pacific and the Gulf of Mexico), and State Offshore reserves), and proved reserves rose 28% in Alaska and 18% in the Federal Offshore (both Pacific and the Gulf of Mexico)(Figure 8).

<sup>6</sup> EIA *Short-Term Energy Outlook*, published October 10, 2018.

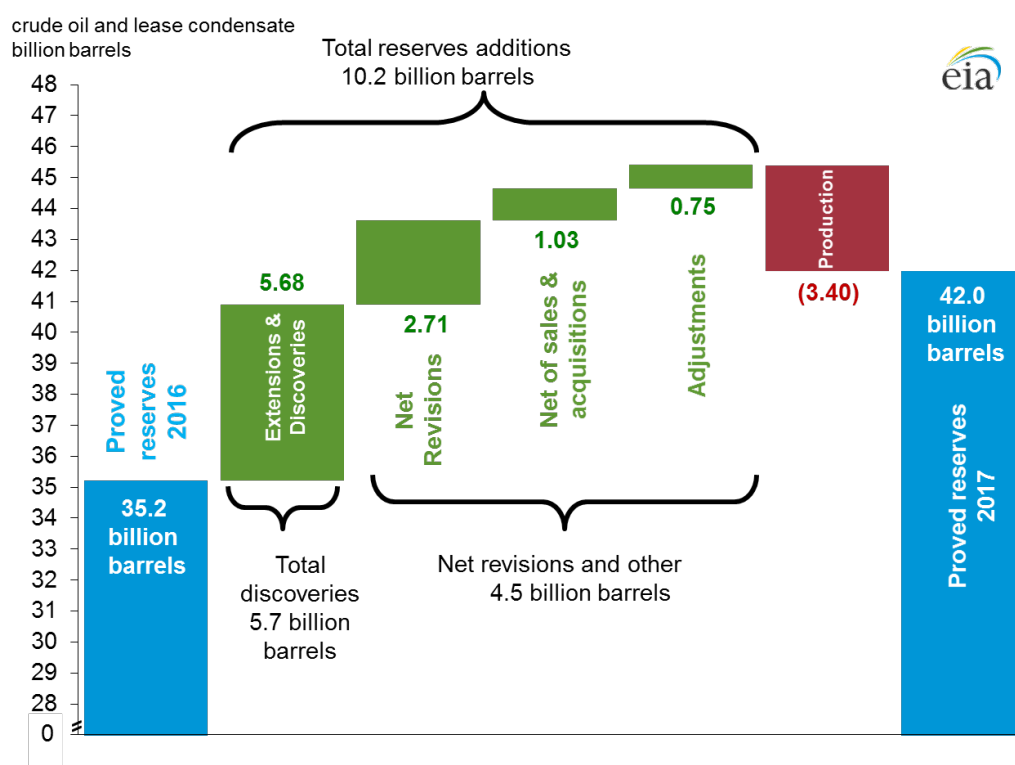
<sup>7</sup> EIA *Crude Oil and Natural Gas Drilling Activity*, EIA and Baker Hughes, Inc., Houston, Texas.

**Figure 8. U.S. crude oil and lease condensate proved reserves, 1985–2017**

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves, 1985–2017*

U.S. crude oil and lease condensate proved reserves increased by 6.8 billion barrels (19.2%) in 2017, as the combination of total discoveries of 5.7 billion barrels and net revisions, net acquisitions, and adjustments totaling 4.5 billion barrels exceeded 2017 annual production of 3.4 billion barrels (Figure 9a).

Figure 9a. U.S. crude oil and lease condensate proved reserves changes, 2016–17



Note: Component columns may not add to total because of independent rounding. Y-axis has a nonstandard scale.

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

Texas saw the largest net increase in crude oil and lease condensate proved reserves (3.3 billion barrels) of all states in 2017—an increase of 24% from 2016. In 2017, the largest proved reserves gains were in the Permian Basin of West Texas (Texas Railroad Commission Districts 8, 8A, and 7C) where operators developed the Wolfcamp/Bone Spring shale play within the Delaware Basin and the Spraberry Trend Area of the Midland Basin.

The second-largest net increase in crude oil and lease condensate proved reserves were in New Mexico (1.0 billion barrels) in 2017—an increase of 62% from 2016. In eastern New Mexico (portions of which are within the Permian Basin) operators developed the Wolfcamp shale play and the Bone Spring formation.

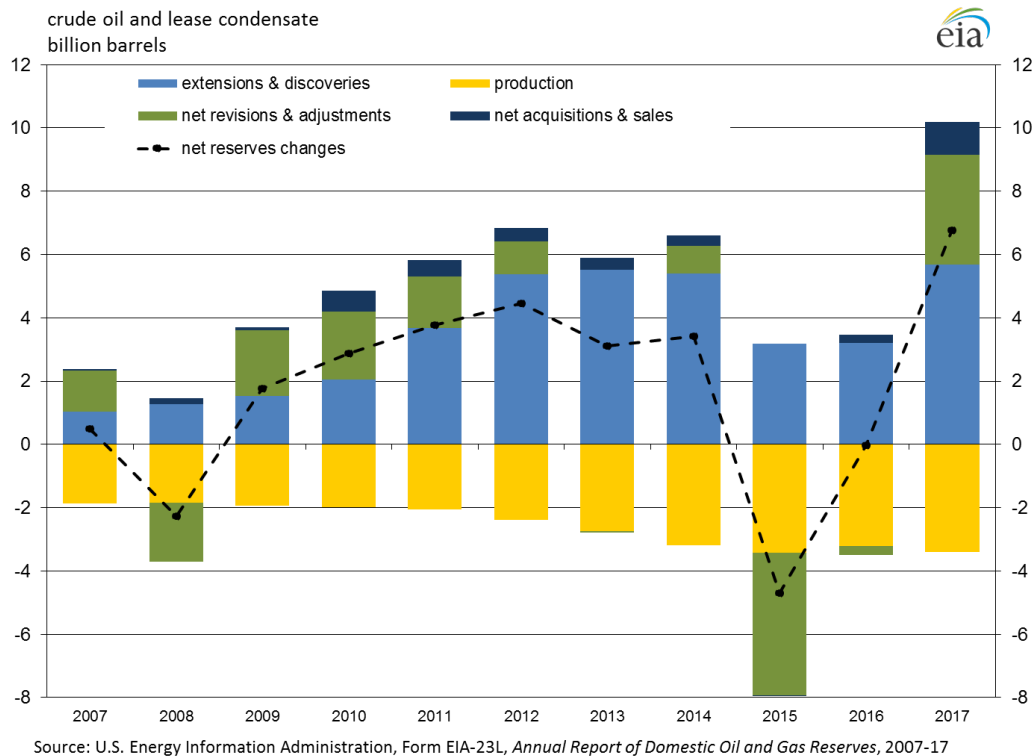
The Federal Offshore Gulf of Mexico (GOM) had the third-largest increase in crude oil and lease condensate proved reserves (729 million barrels) in 2017—an increase of 18% from 2016. This is the first increase in the proved reserves of the GOM since 2012.

Alaska saw the fourth-largest net increase of crude oil and lease condensate proved reserves of all states in 2017—442 million barrels (28% increase). The states of Utah and Kansas experienced the largest net declines in proved reserves in 2017, (drops of 79 million barrels and 65 million barrels, respectively).



The increase in oil price in 2017 and increased development activity resulted in net increases to all other components of proved reserves, despite production levels not seen since 1972 (Figure 9b).

**Figure 9b. Components of U.S. crude oil and lease condensate annual reserves changes, 2007–17**



As of December 31, 2017, *tight plays*<sup>8</sup> accounted for 48% of all U.S. crude oil and lease condensate proved reserves. Most of these proved reserves (98%) came from seven tight plays (Table 2). The Wolfcamp/Bone Spring shale play in the Permian Basin surpassed the Bakken/Three Forks play in the Williston Basin to become the largest oil-producing tight play in the United States in 2017. EIA publishes a [series of maps and animations](#) showing U.S. shale and other tight plays where oil and natural gas are produced.

<sup>8</sup> *Tight plays* (sometimes called *resource plays*) produce oil from petroleum-bearing formations with low permeability such as the Eagle Ford, the Bakken, and other formations that must be hydraulically fractured to produce oil at commercial rates. A kerogen-bearing, thermally mature shale is the source rock that typically lends its name to the play.

**Table 2. Crude oil production and proved reserves from selected U.S. tight plays, 2016–17**  
(million barrels)

Basin	Play	State(s)	2016	2016	2017	2017	Change
			Production	Reserves	Production	Reserves	2016–17 Reserves
Permian	Bone Spring, Wolfcamp	NM, TX	426	4,960	592	8,319	3,359
Williston	Bakken/Three Forks	ND, MT, SD	375	5,226	387	5,447	221
Western Gulf	Eagle Ford	TX	438	4,163	411	4,815	652
Anadarko, S. OK	Woodford	OK	27	389	36	412	23
Appalachian	Marcellus*	PA, WV	13	139	17	279	140
Denver	Niobrara	CO, NE, WY	16	225	11	232	7
Fort Worth	Barnett	TX	3	22	2	20	-2
<b>Sub-total</b>			<b>1,298</b>	<b>15,124</b>	<b>1,456</b>	<b>19,524</b>	<b>4,400</b>
Other tight			42	431	35	449	18
<b>U.S. tight plays</b>			<b>1,340</b>	<b>15,555</b>	<b>1,491</b>	<b>19,973</b>	<b>4,418</b>

Notes: Includes lease condensate. Bakken/Three Forks oil includes proved reserves from shale or low-permeability formations reported on Form EIA-23L. Bone Spring and Wolfcamp includes proved reserves from shale or low-permeability formations reported on Form EIA-23L in TX RRC 7C, TX RRC 8, TX RRC 8A, and NME.

**Other tight** includes proved reserves from shale formations reported on Form EIA-23L not assigned by EIA to the Bakken/Three Forks, Barnett, Bone Spring, Eagle Ford, Marcellus, Niobrara, Wolfcamp, or Woodford tight plays.

\* The Marcellus play in this table refers only to portions within Pennsylvania and West Virginia.

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, 2016 and 2017

**Extensions and discoveries.** Reserves additions—including discoveries of new fields, identification of new reservoirs in fields discovered in previous years, and reserve additions that result from the additional drilling and exploration in previously discovered reservoirs (extensions)—added 5.7 billion barrels to U.S. crude oil and lease condensate reserves in 2017. The largest extensions and discoveries of crude oil and lease condensate proved reserves in 2017 were in Texas, North Dakota, and New Mexico. Texas had 3.1 billion barrels, North Dakota had 0.7 billion barrels, and New Mexico had 0.5 billion barrels of extensions and discoveries in 2017.

**Net revisions and other changes.** Revisions to reserves occur primarily when operators change their estimates of what they are able to economically produce from the properties they operate using existing technology and current economic conditions. Current prices are critical in estimating economically producible reserves. Other changes occur when operators buy and sell properties (revaluing the proved reserves in the process) and as various adjustments are made to reconcile estimated volumes.

Net upward revisions increased U.S. crude oil and lease condensate proved reserves by 2.7 billion barrels in 2017. The largest net upward revisions of crude oil and lease condensate proved reserves were in Texas, the GOM, and Alaska. Operators in Texas revised their reserves estimates upward by 1.0 billion barrels, in the GOM by 0.8 billion, and in Alaska by 0.6 billion barrels.

The U.S. crude oil and lease condensate proved reserves associated with buying and selling properties<sup>9</sup> had a net increase of 1.0 billion barrels in 2017. Adjustments (positive and negative reserves changes that EIA cannot attribute to any other category) increased U.S. proved oil reserves by 0.8 billion barrels.

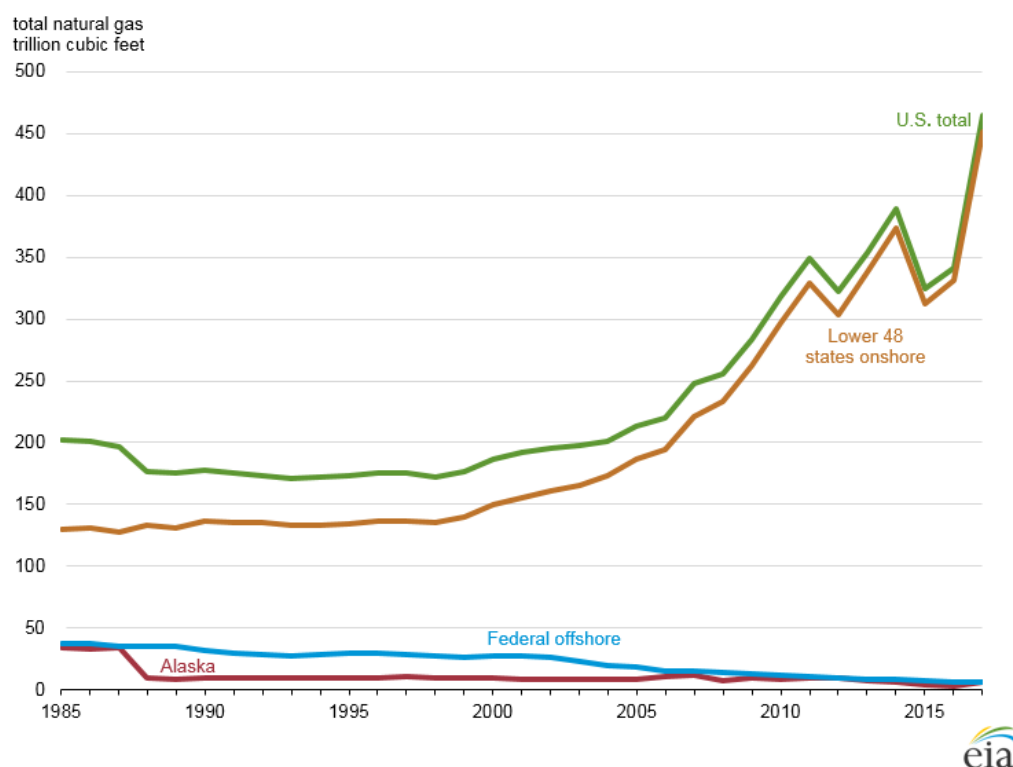
<sup>9</sup> How can Acquisitions in a given year exceed Sales? When it comes to proved reserves, an exchange of properties is not a zero-sum game. Operators often have differing development plans for oil- and natural gas-bearing properties they purchase from or exchange with other operators. For example, when an operator purchases acreage that is adjacent to its producing wells, the operator can drill longer horizontal laterals and add more proved reserves.

**Production.** EIA's official published estimate of total U.S. crude oil production is 3,413 million barrels in 2017, an increase of 6% from 2016. As estimated using EIA-23L responses<sup>10</sup>, the United States produced 3,401 million barrels of crude oil and lease condensate in 2017, an increase of 6% from 2016. Production onshore in the Lower 48 states was 6% higher than the 2016 level, and Federal Offshore (both Pacific and Gulf of Mexico) production experienced a 5% increase based on the EIA-23L data.

## Natural gas proved reserves

The United States had 464.3 Tcf of proved natural gas reserves as of December 31, 2017. U.S. proved reserves of total natural gas (including natural gas plant liquids) increased by 123.2 Tcf (36.1%) (Figure 10).

**Figure 10. U.S. total natural gas proved reserves, 1985–2017**

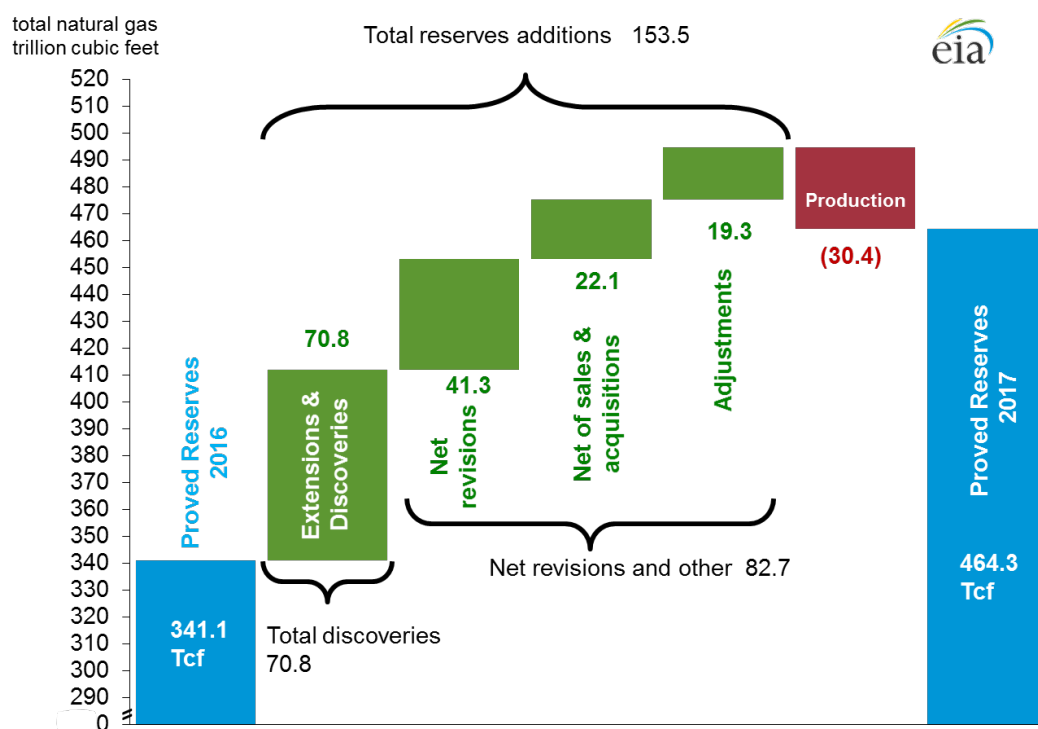


Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves, 1985–2017*

The spot price of U.S. natural gas at the Louisiana Henry Hub began at \$3.71 per MMBtu in January 2017; however, the price hovered at or near the \$3 per MMBtu mark throughout the year. The 12-month, first-of-the-month average natural gas spot price at the Henry Hub in Louisiana in 2017 was \$2.99 per MMBtu. Unlike in 2015, when operators revised their natural gas proved reserves downward by more than 80 Tcf, net revisions in 2017 resulted in a large net increase of 41 Tcf to natural gas proved reserves and those were outweighed by extensions and discoveries of 71 Tcf (Figure 11a).

<sup>10</sup> The oil production estimates in this report are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for crude oil and lease condensate for 2017 contained in the *Petroleum Supply Annual 2017*, DOE/EIA-0340(17).

Figure 11a. U.S. total natural gas proved reserves changes, 2016–17



Note: Component columns may not add to total due to independent rounding. Y-axis has a nonstandard scale.  
 Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

Operators in Pennsylvania and Texas reported the largest net increases in natural gas proved reserves in 2017. Pennsylvania natural gas proved reserves increased by 45% (28.1 Tcf) because of higher prices and the continued development of the Marcellus and Utica shale plays. Texas natural gas proved reserves increased by 31% (26.9 Tcf) because of higher prices and the development of the Wolfcamp/Bone Spring shale play in the west and the Haynesville/Bossier shale play in the east. The third-largest net increase in natural gas proved reserves occurred in Louisiana, where natural gas reserves increased by 18.4 Tcf (Haynesville shale play). The fourth- and fifth-largest net increases in natural gas proved reserves occurred in West Virginia and Ohio (11.1 Tcf, each), respectively, as a result of development of the Marcellus and Utica shale plays.

**Extensions and discoveries.** The U.S. total of natural gas extensions and discoveries were 70.8 Tcf in 2017 (Table 3), with 86% of those discoveries were from shale plays. Extensions and discoveries accounted for 46% of all proved reserves additions in 2017.

**Table 3. Changes to proved reserves of U.S. natural gas by source, 2016–17**  
(trillion cubic feet)

Source of natural gas	Year-End 2016	2017	2017	2017	Year-End 2017
	Proved Reserves	Extensions & Discoveries	Revisions & other changes	2017 Production	Proved Reserves
Coalbed methane	10.6	0.0	2.2	-1.0	11.9
Shale	209.8	60.8	55.9	-18.6	307.9
Other U.S. natural gas					
Lower 48 onshore	110.3	9.7	20.5	-9.4	131.1
Lower 48 offshore	7.1	0.2	0.6	-1.1	6.8
Alaska	3.3	0.1	3.5	-0.3	6.6
<b>U.S. total</b>	<b>341.1</b>	<b>70.8</b>	<b>82.8</b>	<b>-30.4</b>	<b>464.3</b>

Note: The Lower 48 offshore subtotal in this table includes state offshore and Federal Offshore. Components may not add to total because of independent rounding.  
Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, 2016 and 2017

Extensions and discoveries of natural gas reserves were highest in Pennsylvania and West Virginia at 21.6 Tcf and 13.7 Tcf, respectively. Texas saw the third-largest volume of extensions and discoveries in 2017 (12 Tcf). Extensions and discoveries in Pennsylvania and West Virginia were from extensions in the Marcellus shale play, the largest natural gas shale play in the United States by volume of reserves. Natural gas discoveries in Texas were from extensions to oil fields with associated-dissolved natural gas in the Permian Basin (TX RRC Districts 8, 8A, 7C), associated-dissolved and nonassociated natural gas in the Eagle Ford shale play (TX RRC Districts 1-5) and nonassociated natural gas in the Haynesville/Bossier shale play (TX RRC District 6).

**Net revisions and other changes.** Net revisions increased U.S. total natural gas proved reserves by 41.3 Tcf in 2017. This increase is significantly larger than net revisions reported in the previous 10 years, which were typically less than 10 Tcf per year. The following states had the largest net upward revisions in 2017:

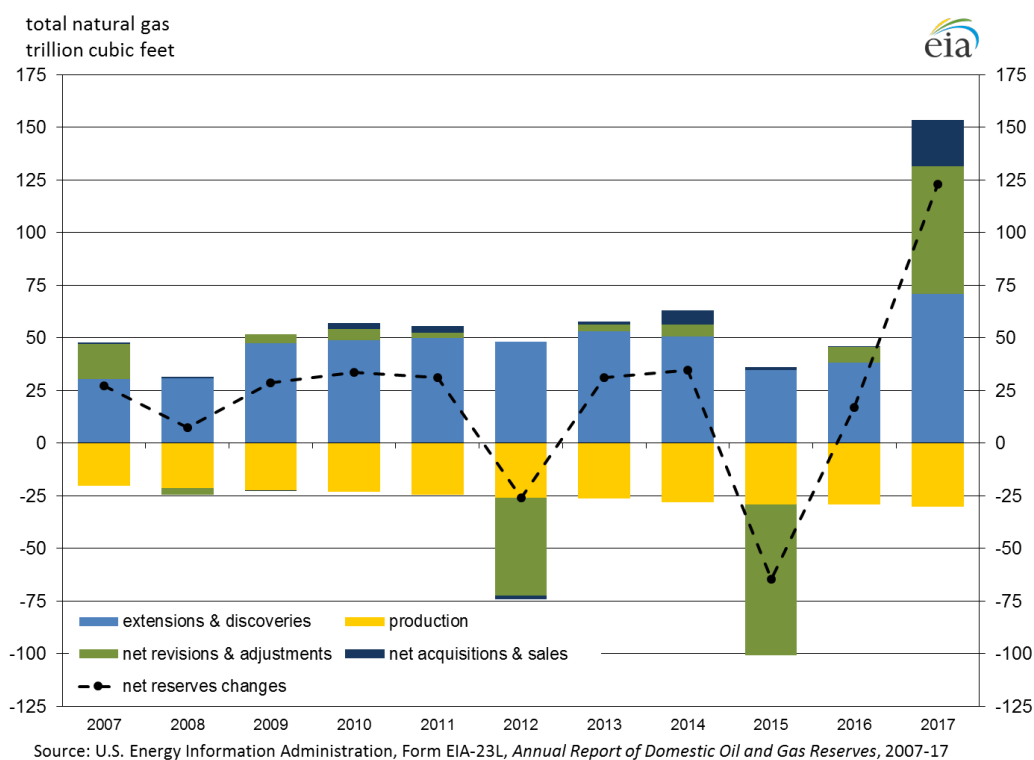
- Texas had the largest net revision increase of natural gas proved reserves of all states in 2017, with an increase of 13.4 Tcf.
- Pennsylvania had the second-largest net revision increase of natural gas proved reserves (10.3 Tcf).
- Ohio had the third-largest net revision increase of natural gas proved reserves (5.6 Tcf).
- Louisiana had the fourth-largest net revision increase of natural gas proved reserves (4.5 Tcf).

The net change to natural gas proved reserves from the purchase and sale of properties resulted in an additional gain of 22.1 Tcf in 2017. Adjustments (annual reserves changes that EIA cannot attribute to any other category) added 19.3 Tcf to U.S. total natural gas proved reserves in 2017.

**Production.** EIA’s official published estimate of **marketed natural gas production** is 29.2 Tcf in 2017, an increase of 3% from 2016. As estimated using EIA-23L responses and used in the reserves calculations in this report,<sup>11</sup> U.S. production of total natural gas, wet after lease separation, in 2017 is estimated to be 30.4 Tcf—an increase of 4% from 2016.

Figure 11b summarizes the components of U.S. natural gas annual reserves changes over time:

**Figure 11b. Components of U.S. natural gas annual reserves changes, 2007–17**



### Nonassociated natural gas

Nonassociated natural gas, also called *gas well gas*, is defined as natural gas not in contact with significant quantities of crude oil in a reservoir. EIA considers most shale natural gas and all coalbed natural gas to be nonassociated natural gas. Nonassociated natural gas made up almost three-quarters of production in the United States in 2017. Proved reserves of U.S. nonassociated natural gas increased by 95.9 Tcf in 2017, a 36% increase from 2016. Estimated production of U.S. nonassociated natural gas increased 2%—from 22.7 Tcf in 2016 to 23.2 Tcf in 2017. The largest increase in 2017 nonassociated natural gas proved reserves (28.3 Tcf) was in Pennsylvania (Marcellus Shale). The largest decrease in 2017 nonassociated natural gas proved reserves (0.4 Tcf) was in Oklahoma (Oklahoma total natural gas proved reserves increased by 4.2 Tcf in 2017).

### Associated-dissolved natural gas

Associated-dissolved natural gas, also called *casinghead gas*, is defined as the combined volume of natural gas that occurs in crude oil reservoirs either as free gas (associated) or as natural gas in solution with crude oil (dissolved). Associated-dissolved natural gas made up more than a fifth of production in the United States in

<sup>11</sup> The natural gas production estimates in this report are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. Estimates differ from the official U.S. EIA production data for natural gas published in the *Natural Gas Annual 2017*, DOE/EIA-0131(17).

2017. Proved reserves of associated-dissolved natural gas increased from 72.2 Tcf in 2016 to 99.4 Tcf in 2017—an increase of 38% (27.2 Tcf). Estimated production of associated-dissolved natural gas increased 12%—from 6.4 Tcf in 2016 to 7.2 Tcf in 2017. The largest increase in 2017 associated-dissolved natural gas proved reserves (10.3 Tcf) was in Texas (86% of this increase was in the Permian Basin).

### **Coalbed natural gas**

Coalbed natural gas, also called *coalbed methane*, is a type of natural gas contained in and produced from coal seams. Extraction requires drilling wells into the coal seams and removing water contained in the seams to reduce hydrostatic pressure and to release adsorbed (and free) natural gas from the coal. Coalbed natural gas made up only 3% of production in the United States in 2017. Proved reserves of U.S. coalbed natural gas increased from 10.6 Tcf in 2016 to 11.9 Tcf in 2017, a 12% increase. Estimated production of coalbed natural gas decreased 4%—from 1.02 Tcf in 2016 to 0.98 Tcf in 2017. In 2017, New Mexico experienced the largest increase (0.97 Tcf) in proved reserves of coalbed methane, and Alabama had the largest decrease (0.2 Tcf) in coalbed methane proved reserves.

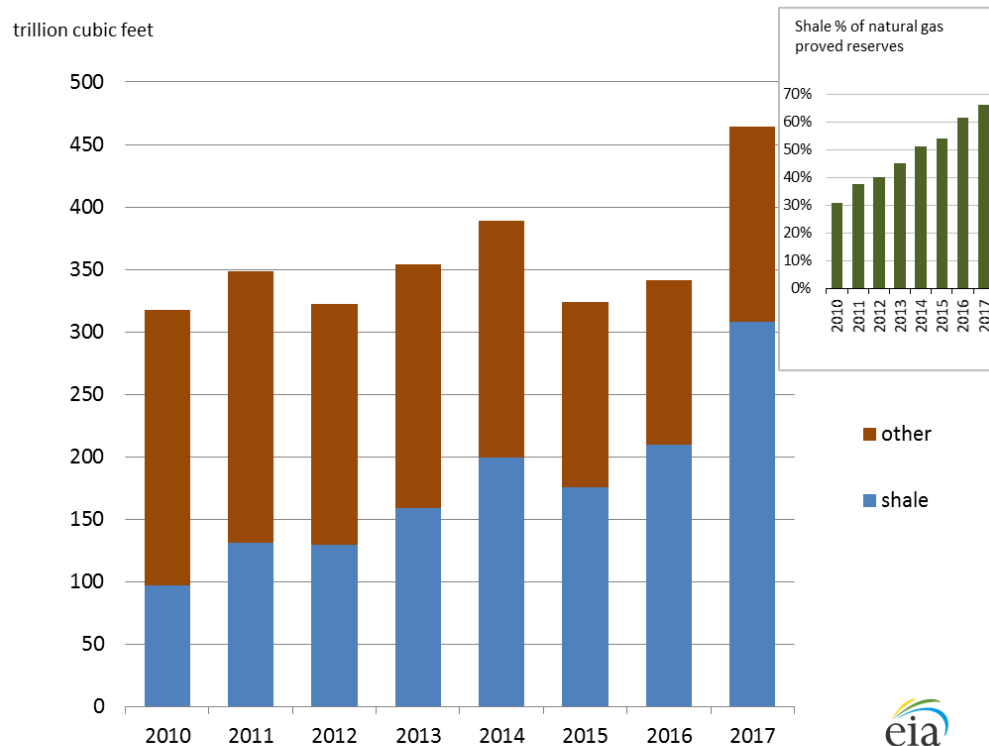
As of Year-End 2017, coalbed methane proved reserves represent only 2.6% of the U.S. total natural gas proved reserves. EIA will not include coalbed methane proved reserves as a separate data category in its *U.S. Crude Oil and Natural Gas Proved Reserves, Year-End 2018* report.

### **Natural gas from shale**

Shale formations can be both the *source rock* (where the oil and gas is generated from organic matter in the rock) and the *producing formation* (the rock from which the oil and gas is produced). Shale reservoirs must typically be hydraulically fractured to produce natural gas at economic rates. Horizontally-drilled wells perform substantially better than vertical wells (but they are more expensive to drill and complete at the same depth). Proved reserves of U.S. natural gas from shale increased from 209.8 Tcf in 2016 to 307.9 Tcf in 2017.

The share of natural gas from shale compared with total U.S. natural gas proved reserves increased from 62% in 2016 to 66% in 2017 (Figure 12). Estimated production of natural gas from shale increased 9%—from 17.0 Tcf in 2016 to 18.6 Tcf in 2017.

Figure 12. U.S. total natural gas proved reserves (shale and other sources), 2010–17

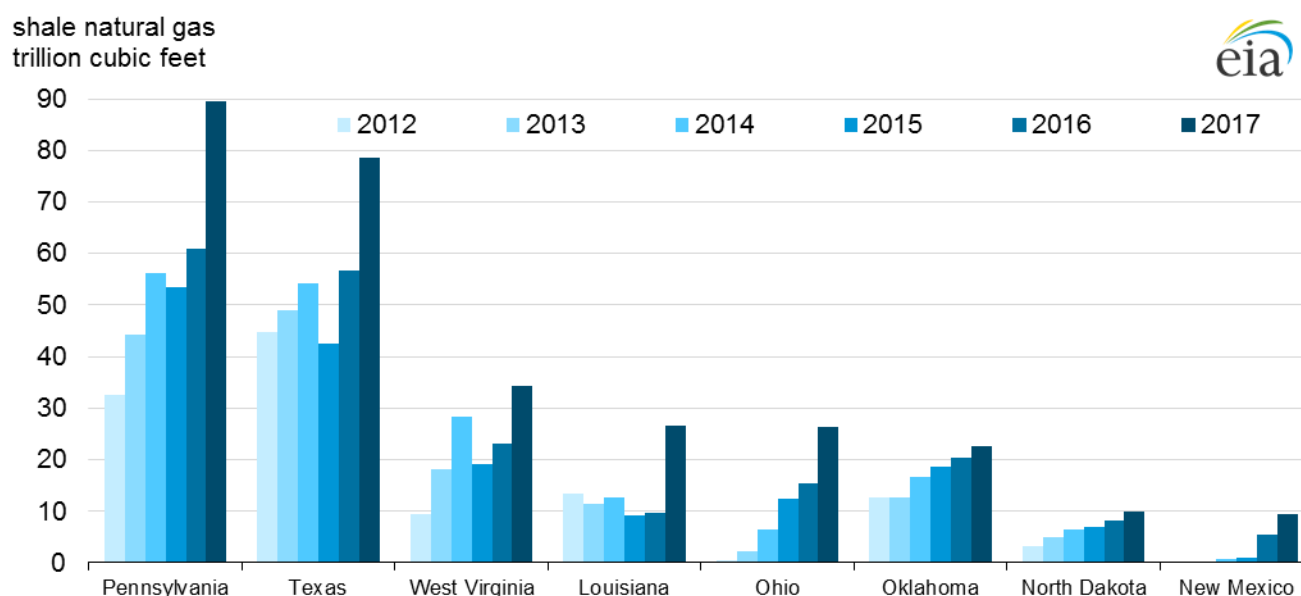


The following eight States reported the most proved reserves of shale natural gas (Figure 13):

- Pennsylvania had the most natural gas proved reserves from shale in 2017 (89.5 Tcf)
- Texas had the second-most (78.7 Tcf)
- West Virginia (34.3 Tcf) remained the third-largest
- Louisiana (26.5 Tcf) was the fourth-largest
- Ohio (26.5 Tcf) was the fifth-largest
- Oklahoma (22.7 Tcf) was the sixth-largest
- North Dakota (10.0 Tcf) was the seventh-largest
- New Mexico (9.5 Tcf) was the eighth-largest shale gas proved reserves state



Figure 13. Proved shale gas reserves of the top eight U.S. shale gas reserves states, 2012–17



Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, 2012–17

Eight shale plays contained 95% of U.S. shale gas proved reserves at the end of 2017 (Table 4). The Marcellus remained the play with the largest amount of natural gas proved reserves from shale in 2017. Its proved reserves increased in 2017 by 47%. The second-largest shale gas play in 2017 was the Haynesville/Bossier shale play, where proved reserves almost tripled.

**Table 4. U.S. shale plays: natural gas production and proved reserves, 2016–17**  
(trillion cubic feet)

Basin	Shale play	State(s)	2016		2017		Change 2017–2016	
			Production	Reserves	Production	Reserves	Production	Reserves
Appalachian	Marcellus*	PA,WV	6.3	84.1	6.9	123.8	0.6	39.7
TX-LA Salt	Haynesville/Bossier	LA, TX	1.5	13.0	1.8	35.9	0.3	22.9
Permian Basin	Wolfcamp, Bone Spring	NM, TX	1.7	19.1	2.2	31.9	0.5	12.8
Western Gulf	Eagle Ford	TX	2.1	22.7	1.9	27.4	-0.2	4.7
Appalachian	Utica/Pt. Pleasant	OH	1.4	15.5	1.7	26.5	0.3	11.0
Anadarko, S. OK	Woodford	OK	1.1	20.2	1.3	22.5	0.2	2.3
Fort Worth	Barnett	TX	1.4	16.8	1.2	19.2	-0.2	2.4
Arkoma	Fayetteville	AR	0.7	6.3	0.6	7.1	-0.1	0.8
<b>Sub-total</b>			<b>16.2</b>	<b>197.7</b>	<b>17.6</b>	<b>294.3</b>	<b>1.4</b>	<b>96.6</b>
Other shale			0.8	12.1	1.0	13.6	0.2	1.5
<b>All U.S. shale</b>			<b>17.0</b>	<b>209.8</b>	<b>18.6</b>	<b>307.9</b>	<b>1.6</b>	<b>98.1</b>

Note: Table values are based on natural gas proved reserves and production volumes from shale reported and imputed from data on Form EIA-23L. For certain reasons (e.g., incorrect or incomplete submissions, misidentification of shale versus nonshale reservoirs), the actual proved reserves and production of natural gas from shale plays may be higher or lower. \* In this table, the Marcellus Shale play refers only to portions within Pennsylvania and West Virginia. *Other shale* includes proved reserves and production reported from shale on Form EIA-23L not assigned by EIA to the Marcellus, Barnett, Haynesville/Bossier, Eagle Ford, Woodford, Utica/Pt. Pleasant, Wolfcamp, Bone Spring, or Fayetteville shale plays.

Columns may not add to subtotals due to independent rounding.

Sources: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, 2016 and 2017

EIA publishes a [series of maps](#) showing the nation's shale gas resources for both shale plays and geologic basins.

### **Dry natural gas proved reserves**

Dry natural gas is the volume of natural gas (primarily methane) that remains after natural gas liquids and non-hydrocarbon impurities are removed from the natural gas stream, usually downstream at a natural gas processing plant. Not all produced gas has to be processed at a natural gas processing plant. Some produced gas is sufficiently dry and satisfies pipeline transportation standards without processing.

EIA calculates its estimate of dry natural gas proved reserves by first estimating the expected yield of natural gas plant liquids from total natural gas proved reserves, then subtracting the gas equivalent volume of the natural gas plant liquids from total natural gas proved reserves.

U.S. dry natural gas proved reserves increased from an estimated 322.2 Tcf in 2016 to 438.5 Tcf in 2017, an increase of 36%.

### **Lease condensate and natural gas plant liquids**

Operators of natural gas fields report lease condensate reserves and production estimates to EIA on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. Natural gas plant liquids are determined from data reported on Form EIA-64A, *Annual Report of the Origin of Natural Gas Liquids Production*. EIA calculates the expected yield of natural gas plant liquids using estimates of total natural gas reserves and a recovery factor determined for each area of origin based on the EIA-64A data.

#### **Lease condensate**

Lease condensate is a mixture consisting primarily of hydrocarbons heavier than pentanes that is recovered as a liquid from natural gas in lease separation facilities. This category excludes natural gas plant liquids, such as propane, butane, and natural gasoline, which are recovered at downstream natural gas processing plants or facilities. Lease condensate usually enters the crude oil stream.

As of December 31, 2017, the United States had 2,830 million barrels of lease condensate proved reserves, an increase of 390 million barrels from 2016 (16%). U.S. lease condensate production decreased 9%—from 270 million barrels in 2016 to 246 million barrels in 2017.

#### **Natural gas plant liquids**

Natural gas plant liquids (unlike lease condensate) remain within the natural gas after it passes through lease separation equipment. These liquids are normally separated from the natural gas at processing plants, fractionators, and cycling plants. Natural gas plant liquids that are extracted include ethane, propane, butane, isobutane, and natural gasoline. Lease condensate is not a natural gas plant liquid and is not a component of the natural gas plant liquids total.

The estimated volume of natural gas plant liquids contained in proved reserves of total natural gas increased from 14.7 billion barrels in 2016 to 19.2 billion barrels in 2017 (a 30% increase).

## Reserves in nonproducing reservoirs

Not all proved reserves are contained in actively producing reservoirs. Reserves within actively producing reservoirs are known as *proved, developed, producing reserves*. Two additional categories for proved reserves exist: *proved, developed, nonproducing reserves (PDNPs)*, and *proved, undeveloped reserves (PUDs)*.

Examples of PDNPs include: existing producing wells that are shut in awaiting well workovers; drilled wells that await completion; drilled well sites that require installation of production equipment or pipeline facilities; or behind-the-pipe reserves that require the depletion of other zones or reservoirs before they can be placed on production (by recompleting the well).

An example of PUDs are undrilled offset well locations (acreage adjacent to an existing producing well that is scheduled to have wells drilled upon it). However, additional conditions must be met to satisfy the definition of proved reserves:

- The locations are directly offset to wells that have commercial production in the objective formation
- Such locations are reasonably certain to be within the known proved productive limits of the objective formation
- The locations conform to existing well spacing regulations where applicable
- The locations are reasonably certain to be developed. SEC rules currently require development within a five-year period

Reserves from other locations beyond direct offset wells are categorized as *proved, undeveloped reserves* only where interpretations of geological and engineering data from wells indicate with reasonable certainty that the objective formation is laterally continuous and contains commercially recoverable petroleum at that location.

Table 18 shows the estimated volumes of nonproducing proved reserves of crude oil, lease condensate, nonassociated natural gas, associated-dissolved natural gas, and total natural gas for 2017. As of December 31, 2017 the United States had 16.0 billion barrels of crude oil proved reserves and 167.5 Tcf of natural gas proved reserves in nonproducing reservoirs. This is a 20% increase for crude oil and a 52% increase for total natural gas in nonproducing reservoirs from the 2016 level published in EIA's previous report.

## Maps and additional data tables

### Maps

Figure 14. Crude oil and lease condensate proved reserves by state/area, 2017

Figure 15. Changes in crude oil and lease condensate proved reserves by state/area, 2016–17

Figure 16. Natural gas proved reserves by state/area, 2017

Figure 17. Changes in natural gas proved reserves by state/area, 2016–17

### Oil tables

Table 5. U.S. proved reserves of crude oil and lease condensate, crude oil, and lease condensate, 2007–17

Table 6. Crude oil and lease condensate proved reserves, reserves changes, and production, 2017

Table 7. Crude oil proved reserves, reserves changes, and production, 2017

Table 8. Lease condensate proved reserves, reserves changes, and production, 2017

**Natural gas tables**

Table 9. U.S. proved reserves of total natural gas, wet after lease separation, 2001–17

Table 10. Total natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017

Table 11. Nonassociated natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017

Table 12. Associated-dissolved natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017

Table 13. Shale natural gas proved reserves and production, 2014–17

Table 14. Shale natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017

Table 15. Coalbed methane proved reserves and production, 2014–17

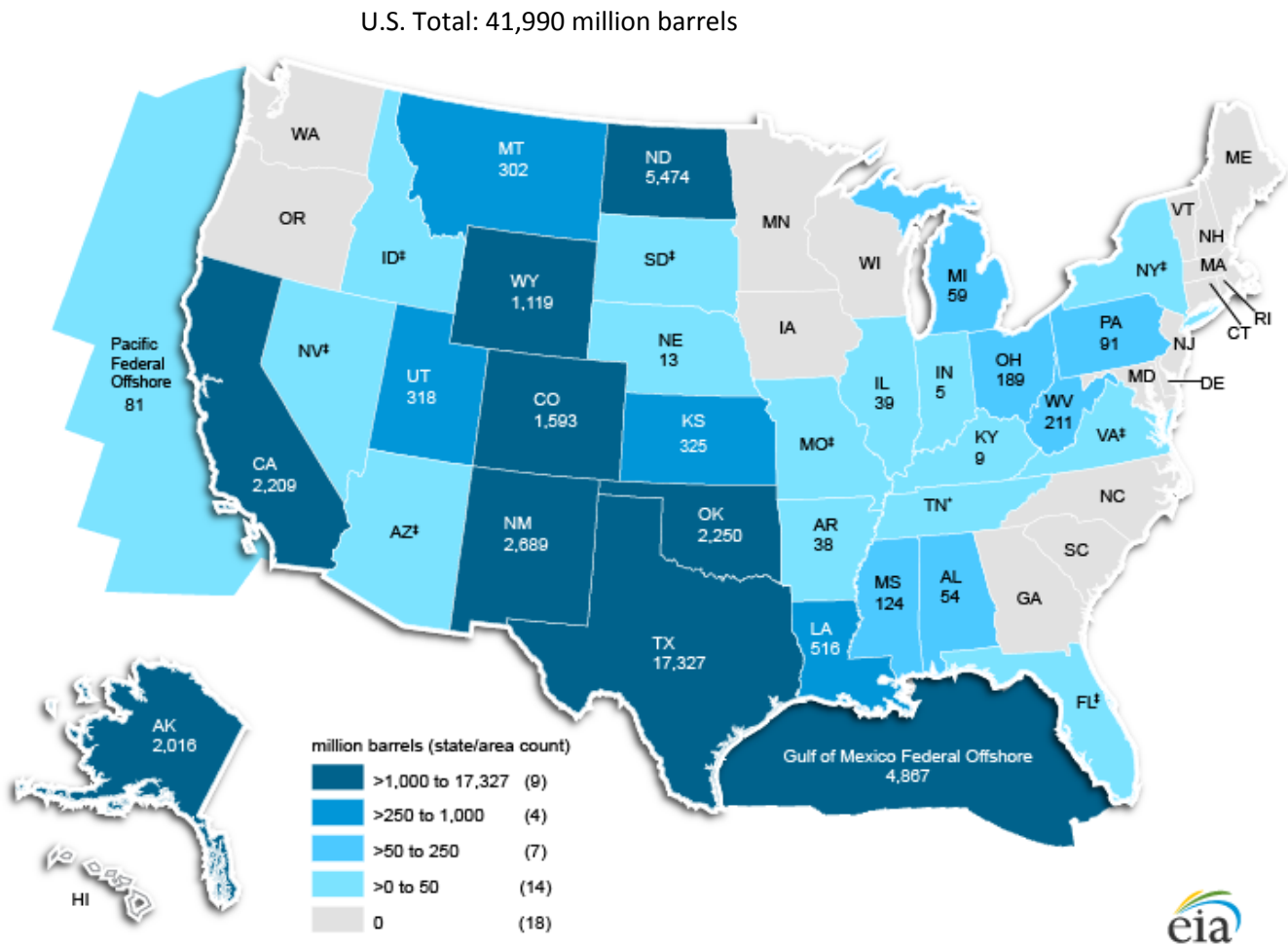
Table 16. Coalbed methane proved reserves, reserves changes, and production, 2017

Table 17. Estimated natural gas plant liquids and dry natural gas proved reserves, 2017

**Miscellaneous/other tables**

Table 18. Reported proved nonproducing reserves of crude oil, lease condensate, nonassociated gas, associated-dissolved gas, and total gas, wet after lease separation, 2017

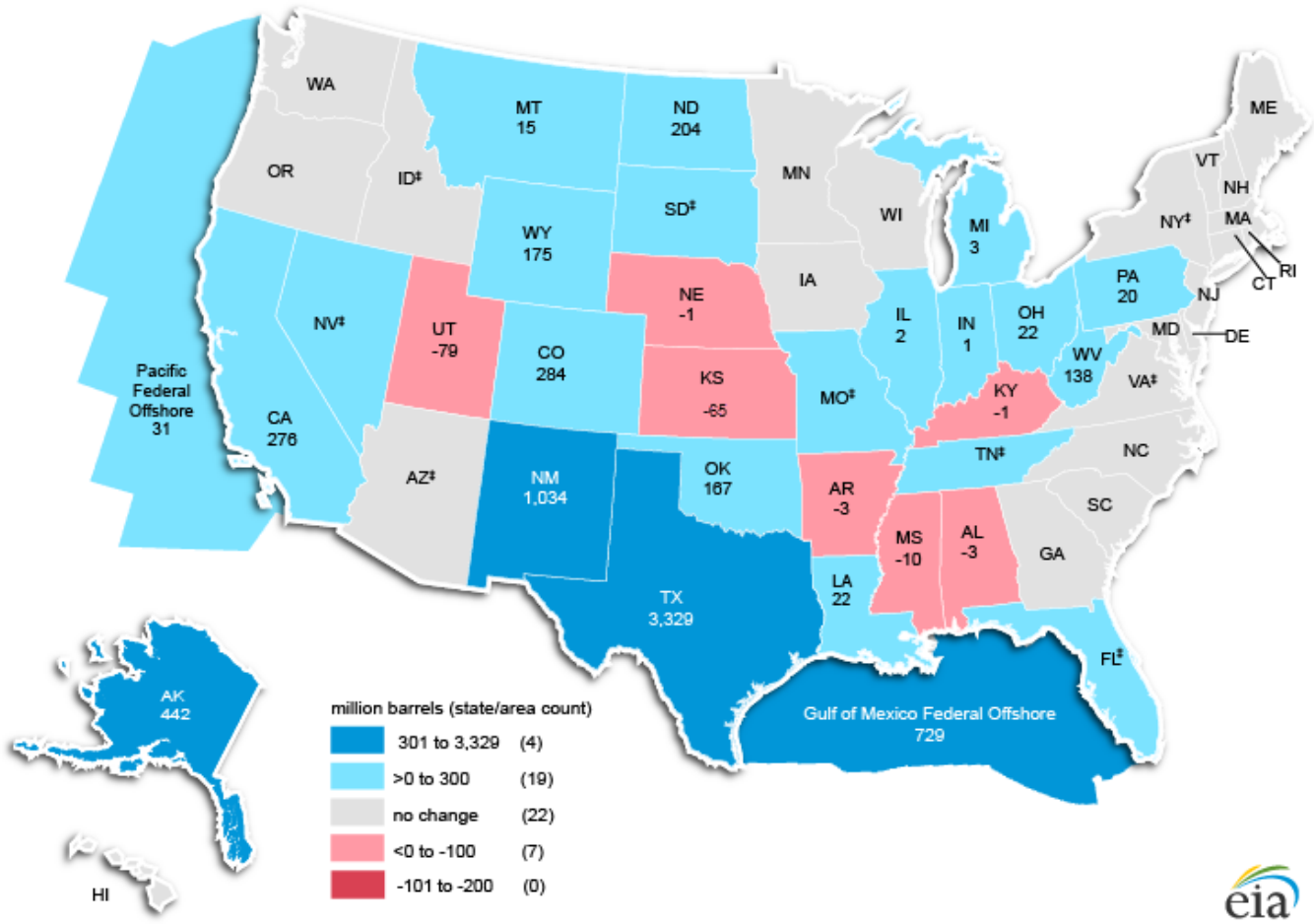
Figure 14. Crude oil and lease condensate proved reserves by state/area, 2017



Source: U.S. Energy Information Administration, Form EIA-23L, Annual Report of Domestic Oil and Gas Reserves

Figure 15. Changes in crude oil and lease condensate proved reserves by state/area, 2016–17

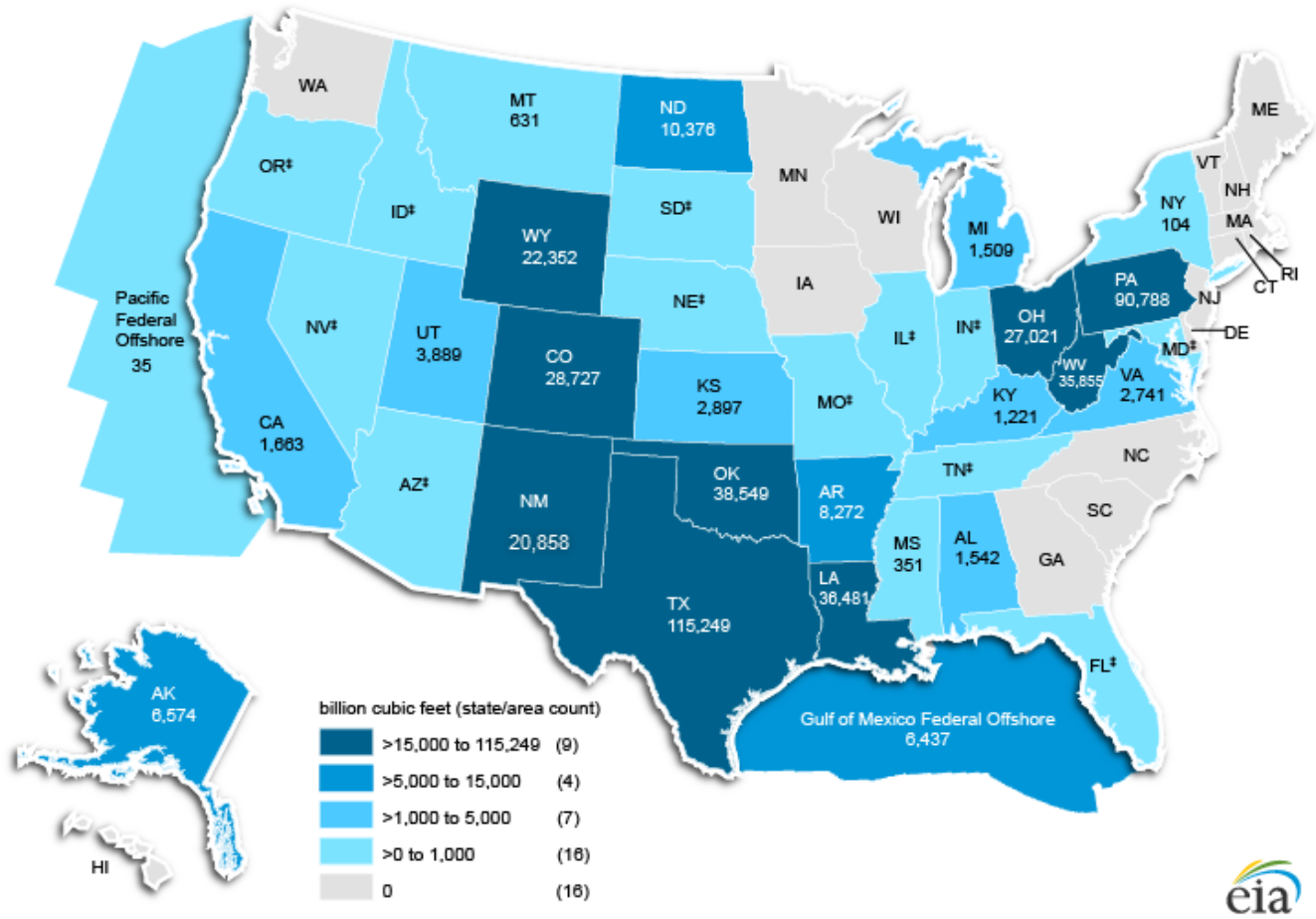
Total U.S. increase: 19.2% (+6,777 million barrels)



Source: U.S. Energy Information Administration, Form EIA-23L, Annual Report of Domestic Oil and Gas Reserves

Figure 16. Natural gas proved reserves by state/area, 2017

U.S. Total: 464,292 billion cubic feet



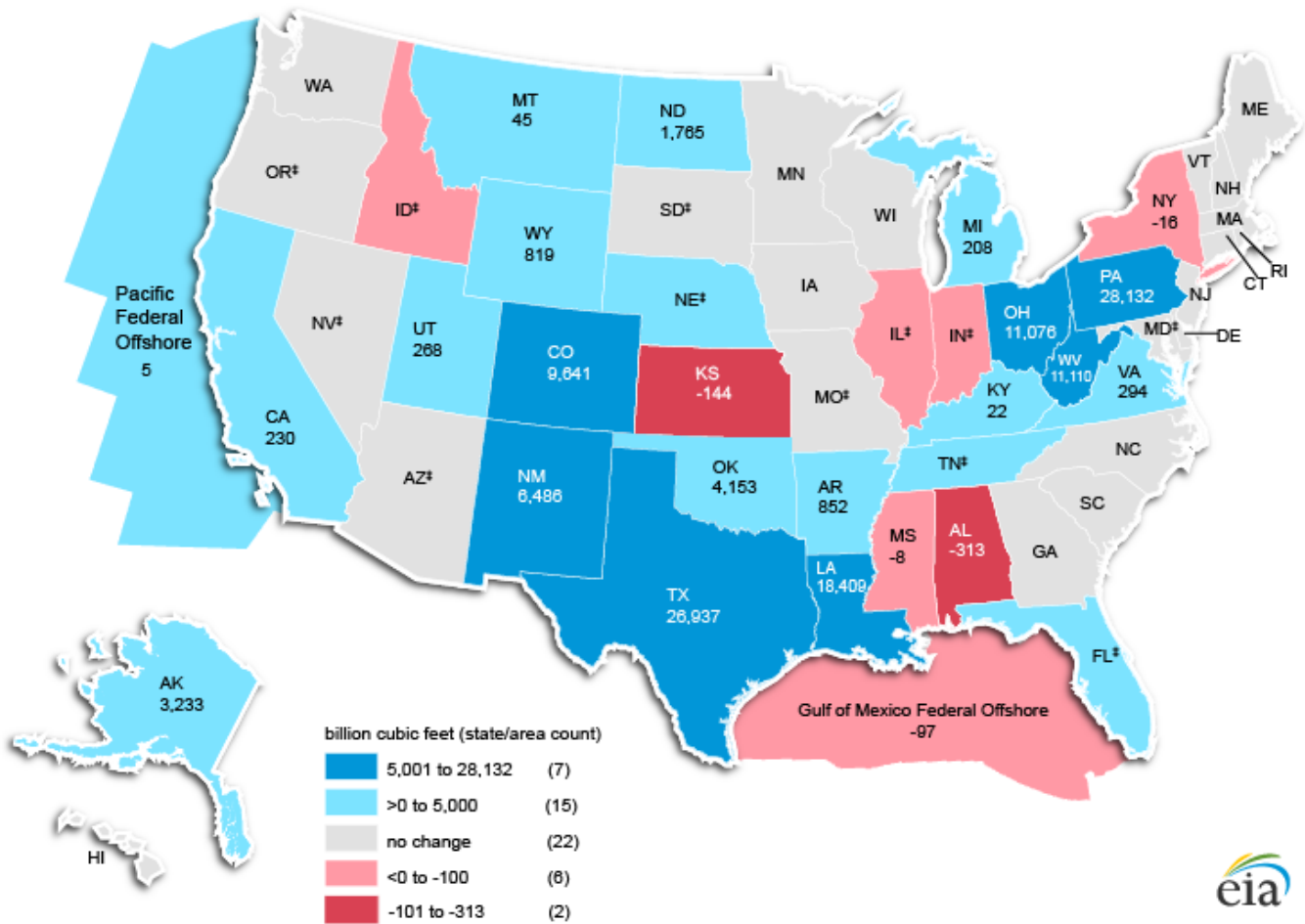
\*Data withheld to avoid disclosure of individual company data

Source: U.S. Energy Information Administration, Form EIA-23L, Annual Report of Domestic Oil and Gas Reserves



Figure 17. Changes in natural gas proved reserves by state/area, 2016–17

Total U.S. increase: 36.1% (+123,159 billion cubic feet)



\* Data withheld to avoid disclosure of individual company data

Source: U.S. Energy Information Administration, Form EIA-23L, Annual Report of Domestic Oil and Gas Reserves





Table 5. U.S. proved reserves of crude oil and lease condensate, 2007–17

million barrels

Year	Adjustments (1)	Net revisions (2)	Revisions <sup>a</sup> and adjustments (3)	Net of sales <sup>b</sup> and acquisitions (4)	Extensions & discoveries (5)	Estimated Production (6)	Proved <sup>c</sup> reserves 12/31 (7)	Change From Prior year (8)
<b>Crude oil and lease condensate (million barrels)</b>								
2007	21	1,275	1,296	44	1,033	1,872	22,812	501
2008	318	-2,189	-1,871	187	1,271	1,845	20,554	-2,258
2009	46	2,008	2,054	95	1,541	1,929	22,315	1,761
2010	188	1,943	2,131	667	2,059	1,991	25,181	2,866
2011	207	1,414	1,621	537	3,676	2,065	28,950	3,769
2012	137	912	1,049	415	5,375	2,386	33,403	4,453
2013	-595	545	-50	389	5,507	2,729	36,520	3,117
2014	440	416	856	353	5,404	3,200	39,933	3,413
2015	1,115	-5,608	-4,493	-30	3,247	3,427	35,230	-4,703
2016	206	-468	-262	264	3,204	3,223	35,213	-17
2017	752	2,712	3,464	1,035	5,679	3,401	41,990	6,777
<b>Crude oil (million barrels)</b>								
2007	65	1,200	1,265	-19	790	1,691	21,317	345
2008	278	-2,039	-1,761	166	1,071	1,672	19,121	-2,196
2009	-4	1,863	1,859	95	1,358	1,751	20,682	1,561
2010	144	1,859	2,003	605	1,744	1,767	23,267	2,585
2011	199	1,325	1,524	480	3,107	1,834	26,544	3,277
2012	109	935	1,044	416	4,637	2,112	30,529	3,985
2013	-620	518	-102	460	4,902	2,418	33,371	2,842
2014	516	321	837	263	4,788	2,874	36,385	3,014
2015	1,115	-4,900	-3,745	-87	2,869	3,104	32,318	-4,067
2016	262	17	279	335	2,794	2,953	32,773	455
2017	822	2,617	3,439	1,000	5,105	3,157	39,160	6,387
<b>Lease condensate (million barrels)</b>								
2007	-44	75	31	63	243	181	1,495	156
2008	40	-150	-110	21	200	173	1,433	-62
2009	50	145	195	0	183	178	1,633	200
2010	44	84	128	62	315	224	1,914	281
2011	8	89	97	57	569	231	2,406	492
2012	28	-23	5	-1	738	274	2,874	468
2013	25	27	52	-71	605	311	3,149	275
2014	-76	95	19	90	616	326	3,548	399
2015	-40	-708	-748	57	378	323	2,912	-636
2016	-56	-485	-541	-71	410	270	2,440	-472
2017	-70	95	25	35	574	244	2,830	390

<sup>a</sup> Revisions and adjustments = Col. 1 + Col. 2.<sup>b</sup> Net of sales and acquisitions = acquisitions - sales<sup>c</sup> Proved reserves = Col. 7 from prior year + Col. 3 + Col. 4 + Col. 5 - Col. 6

Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for crude oil and lease condensate for 2017 contained in the *Petroleum Supply Annual 2017*, DOE/EIA-0340(17). One barrel = 42 U.S. gallons.

See EIA Petroleum and Other Liquids Data at <http://www.eia.gov/petroleum/data.cfm>Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, 2007–17

Table 6. Crude oil and lease condensate proved reserves, reserves changes, and production, 2017

million barrels

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Estimated production (-)	Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)			
Alaska	1,574	4	557	0	0	0	58	177	2,016	
<b>Lower 48 states</b>	<b>33,639</b>	<b>748</b>	<b>5,434</b>	<b>3,279</b>	<b>1,350</b>	<b>2,385</b>	<b>5,621</b>	<b>3,224</b>	<b>39,974</b>	
Alabama	57	-1	7	4	0	1	1	7	54	
Arizona	M	M	M	M	M	M	M	M	M	
Arkansas	41	3	2	3	0	0	0	5	38	
<b>California</b>	<b>1,933</b>	<b>90</b>	<b>319</b>	<b>113</b>	<b>18</b>	<b>90</b>	<b>81</b>	<b>173</b>	<b>2,209</b>	
Coastal Region Onshore	412	12	60	36	1	1	4	19	433	
Los Angeles Basin Onshore	95	32	31	3	17	26	2	12	154	
San Joaquin Basin Onshore	1,263	108	181	74	0	63	66	132	1,475	
State Offshore	163	-62	47	0	0	0	9	10	147	
Colorado	1,309	161	118	139	20	76	217	129	1,593	
Florida	14	-14	M	M	M	M	M	M	M	
Idaho	M	M	M	M	M	M	M	M	M	
Illinois	37	0	3	1	0	0	1	1	39	
Indiana	4	0	1	0	0	0	0	0	5	
Kansas	390	-10	38	58	0	0	1	36	325	
Kentucky	10	-1	2	1	0	0	0	1	9	
<b>Louisiana</b>	<b>494</b>	<b>-11</b>	<b>77</b>	<b>36</b>	<b>19</b>	<b>42</b>	<b>20</b>	<b>51</b>	<b>516</b>	
North	103	14	21	12	0	9	8	13	130	
South Onshore	333	-28	41	24	14	33	12	30	323	
State Offshore	58	3	15	0	5	0	0	8	63	
Maryland	M	M	M	M	M	M	M	M	M	
Michigan	56	5	7	2	2	0	1	6	59	
Mississippi	134	5	8	8	5	7	1	18	124	
Missouri	M	M	M	M	M	M	M	M	M	
Montana	287	10	28	4	3	0	5	21	302	
Nebraska	14	1	0	0	0	0	0	2	13	
Nevada	M	M	M	M	M	M	M	M	M	
<b>New Mexico</b>	<b>1,655</b>	<b>112</b>	<b>179</b>	<b>166</b>	<b>46</b>	<b>628</b>	<b>499</b>	<b>172</b>	<b>2,689</b>	
East	1,579	84	172	129	34	612	464	164	2,584	
West	76	28	7	37	12	16	35	8	105	
New York	M	M	M	M	M	M	M	M	M	
North Dakota	5,270	65	407	417	199	6	733	391	5,474	
Ohio	167	40	69	69	24	7	18	19	189	
Oklahoma	2,083	-37	330	364	123	59	462	160	2,250	
Oregon	M	M	M	M	M	M	M	M	M	
Pennsylvania	71	16	5	14	2	0	21	6	91	
South Dakota	M	M	M	M	M	M	M	M	M	
Tennessee	M	M	M	M	M	M	M	M	M	
<b>Texas</b>	<b>13,998</b>	<b>114</b>	<b>2,547</b>	<b>1,594</b>	<b>769</b>	<b>1,261</b>	<b>3,051</b>	<b>1,281</b>	<b>17,327</b>	
RRC District 1	2,580	34	99	346	158	283	369	212	2,649	
RRC District 2 Onshore	1,422	41	104	97	9	85	262	195	1,613	
RRC District 3 Onshore	573	-52	260	35	75	188	9	45	823	
RRC District 4 Onshore	213	6	61	26	13	39	15	20	275	
RRC District 5	49	13	5	11	8	3	0	4	47	
RRC District 6	165	27	59	13	3	1	2	16	222	
RRC District 7B	102	21	15	5	5	12	0	10	130	
RRC District 7C	1,287	24	128	302	22	84	318	111	1,406	
RRC District 8	5,773	-15	1,367	677	347	518	1,991	528	8,082	
RRC District 8A	1,453	15	338	25	102	10	50	107	1,632	
RRC District 9	133	-8	41	5	1	16	0	12	164	
RRC District 10	247	6	70	51	26	22	35	21	282	
State Offshore	1	2	0	1	0	0	0	0	2	

**Table 6. Crude oil and lease condensate proved reserves, reserves changes, and production, 2017 (cont.)**

million barrels

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	
Utah	397	-61	33	12	56	19	33	35	318
Virginia	M	M	M	M	M	M	M	M	M
West Virginia	73	22	18	19	6	6	130	13	211
Wyoming	944	-2	151	24	27	30	124	77	1,119
<b>Federal Offshore</b>	<b>4,188</b>	<b>190</b>	<b>1,077</b>	<b>231</b>	<b>31</b>	<b>150</b>	<b>222</b>	<b>617</b>	<b>4,948</b>
Pacific (California)	50	26	11	0	0	0	0	6	81
Gulf of Mexico (Central & Eastern) <sup>a</sup>	3,827	163	1,017	186	24	150	218	546	4,619
Gulf of Mexico (Western)	311	1	49	45	7	0	4	65	248
Miscellaneous <sup>b</sup>	13	51	8	0	0	3	0	3	72
<b>U.S. Total</b>	<b>35,213</b>	<b>752</b>	<b>5,991</b>	<b>3,279</b>	<b>1,350</b>	<b>2,385</b>	<b>5,679</b>	<b>3,401</b>	<b>41,990</b>

<sup>a</sup> Includes Federal Offshore Louisiana, Alabama, Mississippi, and Florida.<sup>b</sup> M - Miscellaneous states include Arizona, Florida, Idaho, Maryland, Missouri, Nevada, New York, Oregon, South Dakota, Tennessee, and Virginia.

Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for crude oil and lease condensate for 2017 contained in the *Petroleum Supply Annual 2017*, DOE/EIA-0340(17). One barrel = 42 U.S. gallons. See EIA Petroleum and Other Liquids Data at <http://www.eia.gov/petroleum/data.cfm>

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

Table 7. Crude oil proved reserves, reserves changes, and production, 2017

million barrels

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	
Alaska	1,572	6	557	0	0	0	58	177	2,016
<b>Lower 48 states</b>	<b>31,201</b>	<b>816</b>	<b>4,947</b>	<b>2,887</b>	<b>1,135</b>	<b>2,135</b>	<b>5,047</b>	<b>2,980</b>	<b>37,144</b>
Alabama	43	-1	7	1	0	1	0	6	43
Arizona	M	M	M	M	M	M	M	M	M
Arkansas	40	2	2	2	0	0	0	5	37
<b>California</b>	<b>1,933</b>	<b>90</b>	<b>319</b>	<b>113</b>	<b>18</b>	<b>90</b>	<b>81</b>	<b>173</b>	<b>2,209</b>
Coastal Region Onshore	412	12	60	36	1	1	4	19	433
Los Angeles Basin Onshore	95	32	31	3	17	26	2	12	154
San Joaquin Basin Onshore	1,263	108	181	74	0	63	66	132	1,475
State Offshore	163	-62	47	0	0	0	9	10	147
Colorado	1,267	149	104	135	16	75	210	126	1,528
Florida	14	-14	M	M	M	M	M	M	M
Idaho	M	M	M	M	M	M	M	M	M
Illinois	36	0	3	1	0	0	1	1	38
Indiana	4	0	1	0	0	0	0	0	5
Kansas	358	1	36	57	0	0	1	35	304
Kentucky	10	-2	2	1	0	0	0	1	8
<b>Louisiana</b>	<b>408</b>	<b>-10</b>	<b>64</b>	<b>21</b>	<b>18</b>	<b>29</b>	<b>9</b>	<b>43</b>	<b>418</b>
North	71	11	18	5	0	0	0	10	85
South Onshore	283	-25	34	16	13	29	9	26	275
State Offshore	54	4	12	0	5	0	0	7	58
Maryland	M	M	M	M	M	M	M	M	M
Michigan	51	6	6	2	2	0	1	6	54
Mississippi	126	10	8	8	5	6	1	17	121
Missouri	M	M	M	M	M	M	M	M	M
Montana	285	12	28	4	3	0	5	21	302
Nebraska	14	1	0	0	0	0	0	2	13
Nevada	M	M	M	M	M	M	M	M	M
<b>New Mexico</b>	<b>1,549</b>	<b>97</b>	<b>149</b>	<b>117</b>	<b>31</b>	<b>610</b>	<b>484</b>	<b>160</b>	<b>2,581</b>
East	1,500	84	143	98	30	609	449	154	2,503
West	49	13	6	19	1	1	35	6	78
New York	M	M	M	M	M	M	M	M	M
North Dakota	5,256	79	406	417	199	6	733	391	5,473
Ohio	38	30	15	32	7	7	0	4	47
Oklahoma	1,693	27	280	289	119	58	399	132	1,917
Pennsylvania	2	12	4	5	1	0	0	1	11
South Dakota	M	M	M	M	M	M	M	M	M
Tennessee	M	M	M	M	M	M	M	M	M
<b>Texas</b>	<b>12,859</b>	<b>168</b>	<b>2,290</b>	<b>1,433</b>	<b>630</b>	<b>1,078</b>	<b>2,763</b>	<b>1,159</b>	<b>15,936</b>
RRC District 1	2,414	29	91	296	77	157	330	194	2,454
RRC District 2 Onshore	1,088	38	65	77	5	84	170	149	1,214
RRC District 3 Onshore	526	-47	246	32	74	187	4	38	772
RRC District 4 Onshore	31	5	5	10	4	0	0	3	24
RRC District 5	47	13	3	11	8	3	0	4	43
RRC District 6	109	9	17	10	1	1	0	11	114
RRC District 7B	100	20	14	5	5	12	0	10	126
RRC District 7C	1,280	25	121	302	19	84	318	110	1,397
RRC District 8	5,533	65	1,313	628	322	508	1,858	508	7,819
RRC District 8A	1,452	15	338	25	102	10	50	107	1,631
RRC District 9	124	-7	40	5	1	10	0	11	150
RRC District 10	155	3	37	32	12	22	33	14	192
State Offshore	0	0	0	0	0	0	0	0	0

Table 7. Crude oil proved reserves, reserves changes, and production, 2017 (cont.)

million barrels

State and subdivision	Changes in reserves during 2017								
	Published proved reserves 12/31/16	Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	Proved reserves 12/31/17
Utah	372	-64	23	11	54	19	32	32	285
Virginia	M	M	M	M	M	M	M	M	M
West Virginia	6	8	1	5	0	0	0	1	9
Wyoming	791	-12	128	9	2	3	106	62	943
<b>Federal Offshore</b>	<b>4,033</b>	<b>175</b>	<b>1,063</b>	<b>224</b>	<b>30</b>	<b>150</b>	<b>221</b>	<b>599</b>	<b>4,789</b>
Pacific (California)	50	26	11	0	0	0	0	6	81
Gulf of Mexico (Central and Eastern) <sup>a</sup>	3,678	148	1,004	181	23	150	217	529	4,464
Gulf of Mexico (Western)	305	1	48	43	7	0	4	64	244
Miscellaneous <sup>b</sup>	13	52	8	0	0	3	0	3	73
<b>U.S. Total</b>	<b>32,773</b>	<b>822</b>	<b>5,504</b>	<b>2,887</b>	<b>1,135</b>	<b>2,135</b>	<b>5,105</b>	<b>3,157</b>	<b>39,160</b>

<sup>a</sup> Includes Federal Offshore Louisiana, Alabama, Mississippi, and Florida.<sup>b</sup> M – Miscellaneous states include Arizona, Florida, Idaho, Maryland, Missouri, Nevada, New York, South Dakota, Tennessee, and Virginia.Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for crude oil for 2017 contained in the *Petroleum Supply Annual 2017*, DOE/EIA-0340(17). One barrel = 42 U.S. gallons.See EIA Petroleum and Other Liquids Data at <http://www.eia.gov/petroleum/data.cfm>Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

Table 8. Lease condensate proved reserves, reserves changes, and production, 2017

million barrels

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	
Alaska	2	-2	0	0	0	0	0	0	0
<b>Lower 48 states</b>	<b>2,438</b>	<b>-68</b>	<b>487</b>	<b>392</b>	<b>215</b>	<b>250</b>	<b>574</b>	<b>244</b>	<b>2,830</b>
Alabama	14	0	0	3	0	0	1	1	11
Arizona	M	M	M	M	M	M	M	M	M
Arkansas	1	1	0	1	0	0	0	0	1
<b>California</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Coastal Region Onshore	0	0	0	0	0	0	0	0	0
Los Angeles Basin Onshore	0	0	0	0	0	0	0	0	0
San Joaquin Basin Onshore	0	0	0	0	0	0	0	0	0
State Offshore	0	0	0	0	0	0	0	0	0
Colorado	42	12	14	4	4	1	7	3	65
Florida	M	M	M	M	M	M	M	M	M
Idaho	M	M	M	M	M	M	M	M	M
Illinois	M	M	M	M	M	M	M	M	M
Indiana	M	M	M	M	M	M	M	M	M
Kansas	32	-11	2	1	0	0	0	1	21
Kentucky	0	1	0	0	0	0	0	0	1
<b>Louisiana</b>	<b>86</b>	<b>-1</b>	<b>13</b>	<b>15</b>	<b>1</b>	<b>13</b>	<b>11</b>	<b>8</b>	<b>98</b>
North	32	3	3	7	0	9	8	3	45
South Onshore	50	-3	7	8	1	4	3	4	48
State Offshore	4	-1	3	0	0	0	0	1	5
Maryland	M	M	M	M	M	M	M	M	M
Michigan	5	-1	1	0	0	0	0	0	5
Mississippi	8	-5	0	0	0	1	0	1	3
Missouri	M	M	M	M	M	M	M	M	M
Montana	2	-2	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0	0	0
Nevada	M	M	M	M	M	M	M	M	M
<b>New Mexico</b>	<b>106</b>	<b>15</b>	<b>30</b>	<b>49</b>	<b>15</b>	<b>18</b>	<b>15</b>	<b>12</b>	<b>108</b>
East	79	0	29	31	4	3	15	10	81
West	27	15	1	18	11	15	0	2	27
New York	M	M	M	M	M	M	M	M	M
North Dakota	14	-14	1	0	0	0	0	0	1
Ohio	M	M	M	M	M	M	M	M	M
Oklahoma	390	-64	50	75	4	1	63	28	333
Oregon	M	M	M	M	M	M	M	M	M
Pennsylvania	M	M	M	M	M	M	M	M	M
South Dakota	M	M	M	M	M	M	M	M	M
Tennessee	M	M	M	M	M	M	M	M	M
<b>Texas</b>	<b>1,139</b>	<b>-54</b>	<b>257</b>	<b>161</b>	<b>139</b>	<b>183</b>	<b>288</b>	<b>122</b>	<b>1,391</b>
RRC District 1	166	5	8	50	81	126	39	18	195
RRC District 2 Onshore	334	3	39	20	4	1	92	46	399
RRC District 3 Onshore	47	-5	14	3	1	1	5	7	51
RRC District 4 Onshore	182	1	56	16	9	39	15	17	251
RRC District 5	2	0	2	0	0	0	0	0	4
RRC District 6	56	18	42	3	2	0	2	5	108
RRC District 7B	2	1	1	0	0	0	0	0	4
RRC District 7C	7	-1	7	0	3	0	0	1	9
RRC District 8	240	-80	54	49	25	10	133	20	263
RRC District 8A	1	0	0	0	0	0	0	0	1
RRC District 9	9	-1	1	0	0	6	0	1	14
RRC District 10	92	3	33	19	14	0	2	7	90
State Offshore	1	2	0	1	0	0	0	0	2

**Table 8. Lease condensate proved reserves, reserves changes, and production, 2017 (cont.)**

million barrels

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	
Utah	25	3	10	1	2	0	1	3	33
Virginia	M	M	M	M	M	M	M	M	M
West Virginia	67	14	17	14	6	6	130	12	202
Wyoming	153	10	23	15	25	27	18	15	176
<b>Federal Offshore</b>	<b>155</b>	<b>15</b>	<b>14</b>	<b>7</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>18</b>	<b>159</b>
Pacific (California)	0	0	0	0	0	0	0	0	0
Gulf of Mexico (Central and Eastern) <sup>a</sup>	149	15	13	5	1	0	1	17	155
Gulf of Mexico (Western)	6	0	1	2	0	0	0	1	4
Miscellaneous <sup>b</sup>	199	13	55	46	18	0	39	20	222
<b>U.S. Total</b>	<b>2,440</b>	<b>-70</b>	<b>487</b>	<b>392</b>	<b>215</b>	<b>250</b>	<b>574</b>	<b>244</b>	<b>2,830</b>

<sup>a</sup> Includes Federal Offshore Louisiana, Alabama, Mississippi, and Florida.<sup>b</sup> M – Miscellaneous states include Arizona, Florida, Idaho, Illinois, Indiana, Maryland, Missouri, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Virginia.

Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for lease condensate for 2017 contained in the *Petroleum Supply Annual 2017*, DOE/EIA-0340(17). One barrel = 42 U.S. gallons.

See EIA Petroleum and Other Liquids Data at <http://www.eia.gov/petroleum/data.cfm>Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

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**Table 9. U.S. proved reserves of total natural gas, wet after lease separation, 2001–17**

billion cubic feet

Year	Adjustments (1)	Net revisions (2)	Revisions <sup>a</sup> and adjustments (3)	Net of sales <sup>b</sup> and acquisitions (4)	Extensions & discoveries (5)	Estimated production (6)	Proved <sup>c</sup> reserves 12/31 (7)	Change from prior year (8)
<b>Total natural gas (billion cubic feet)</b>								
2001	1,849	-2,438	-589	2,715	23,749	20,642	191,743	5,233
2002	4,006	1,038	5,044	428	18,594	20,248	195,561	3,818
2003	2,323	-1,715	608	1,107	20,100	20,231	197,145	1,584
2004	170	825	995	1,975	21,102	20,017	201,200	4,055
2005	1,693	2,715	4,408	2,674	24,285	19,259	213,308	12,108
2006	946	-2,099	-1,153	3,178	24,456	19,373	220,416	7,108
2007	990	15,936	16,926	452	30,313	20,318	247,789	27,373
2008	271	-3,254	-2,983	937	30,707	21,415	255,035	7,246
2009	5,923	-1,899	4,024	-222	47,579	22,537	283,879	28,844
2010	1,292	4,055	5,347	2,766	48,879	23,224	317,647	33,768
2011	2,715	-112	2,603	3,298	49,882	24,621	348,809	31,162
2012	-810	-45,614	-46,424	-1,859	48,241	26,097	322,670	-26,139
2013	693	2,794	3,487	1,287	53,017	26,467	353,994	31,324
2014	4,905	984	5,889	6,565	50,487	28,094	388,841	34,847
2015	9,430	-80,762	-71,332	1,417	34,706	29,329	324,303	-64,538
2016	7,086	94	7,180	432	38,371	29,153	341,133	16,830
2017	19,326	41,318	60,644	22,123	70,783	30,391	464,292	123,159

<sup>a</sup> Revisions and adjustments = Col. 1 + Col. 2.<sup>b</sup> Net of sales and acquisitions = acquisitions - sales<sup>c</sup> Proved reserves = Col. 7 from prior year + Col. 3 + Col. 4 + Col. 5 - Col. 6.

Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for natural gas for 2017 contained in the *Natural Gas Annual 2017*, DOE/EIA-0131(17). Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

See EIA Natural Gas Data at <http://www.eia.gov/naturalgas/data.cfm>

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, 2001–17

Table 10. Total natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017

billion cubic feet

State and subdivision	Changes in reserves during 2017								
	Published proved reserves 12/31/16	Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	Proved reserves 12/31/17
Alaska	3,341	320	3,206	0	0	0	50	343	6,574
<b>Lower 48 states</b>	<b>337,792</b>	<b>19,006</b>	<b>69,741</b>	<b>31,629</b>	<b>24,916</b>	<b>47,039</b>	<b>70,733</b>	<b>30,048</b>	<b>457,718</b>
Alabama	1,855	136	84	80	485	166	18	152	1,542
Arizona	M	M	M	M	M	M	M	M	M
Arkansas	7,420	-63	869	118	8	0	869	697	8,272
<b>California</b>	<b>1,433</b>	<b>88</b>	<b>333</b>	<b>123</b>	<b>16</b>	<b>17</b>	<b>80</b>	<b>149</b>	<b>1,663</b>
Coastal Region Onshore	203	-9	33	23	0	0	3	10	197
Los Angeles Basin Onshore	35	22	8	4	16	17	0	6	56
San Joaquin Basin Onshore	1,107	128	280	96	0	0	74	130	1,363
State Offshore	88	-53	12	0	0	0	3	3	47
Colorado	19,086	4,516	3,136	1,912	1,515	5,228	1,888	1,700	28,727
Florida	1	-1	M	M	M	M	M	M	M
Idaho	M	M	M	M	M	M	M	M	M
Illinois	M	M	M	M	M	M	M	M	M
Indiana	M	M	M	M	M	M	M	M	M
Kansas	3,041	74	258	181	498	412	1	210	2,897
Kentucky	1,199	23	105	29	2	0	0	75	1,221
<b>Louisiana</b>	<b>18,072</b>	<b>7,566</b>	<b>7,785</b>	<b>3,246</b>	<b>418</b>	<b>3,144</b>	<b>5,823</b>	<b>2,245</b>	<b>36,481</b>
North	15,762	7,376	7,350	2,816	368	2,971	5,738	1,964	34,049
South Onshore	1,958	220	420	378	46	173	85	235	2,197
State Offshore	352	-30	15	52	4	0	0	46	235
Maryland	M	M	M	M	M	M	M	M	M
Michigan	1,301	261	67	74	2	54	0	98	1,509
Mississippi	359	-46	22	13	5	73	0	39	351
Missouri	M	M	M	M	M	M	M	M	M
Montana	586	22	75	6	2	0	4	48	631
Nebraska	M	M	M	M	M	M	M	M	M
Nevada	M	M	M	M	M	M	M	M	M
<b>New Mexico</b>	<b>14,372</b>	<b>203</b>	<b>1,606</b>	<b>1,122</b>	<b>4,481</b>	<b>9,767</b>	<b>1,832</b>	<b>1,319</b>	<b>20,858</b>
East	6,868	139	1,114	495	177	2,336	1,667	718	10,734
West	7,504	64	492	627	4,304	7,431	165	601	10,124
New York	120	-11	38	26	5	0	0	12	104
North Dakota	8,611	-152	1,759	333	241	3	1,426	697	10,376
Ohio	15,945	180	7,649	2,048	1,305	2,918	5,475	1,793	27,021
Oklahoma	34,396	2,175	3,942	5,260	1,171	1,862	5,091	2,486	38,549
Oregon	M	M	M	M	M	M	M	M	M
Pennsylvania	62,656	-679	13,218	2,959	5,640	8,080	21,584	5,472	90,788
South Dakota	M	M	M	M	M	M	M	M	M
Tennessee	M	M	M	M	M	M	M	M	M
<b>Texas</b>	<b>88,312</b>	<b>2,837</b>	<b>20,349</b>	<b>6,902</b>	<b>4,457</b>	<b>11,188</b>	<b>11,957</b>	<b>8,035</b>	<b>115,249</b>
RRC District 1	7,980	-65	576	564	1,041	1,855	1,269	703	9,307
RRC District 2 Onshore	4,965	182	666	276	121	181	903	696	5,804
RRC District 3 Onshore	2,052	-128	890	95	119	282	206	256	2,832
RRC District 4 Onshore	15,019	89	2,881	409	824	1,721	590	1,086	17,981
RRC District 5	11,154	-330	654	868	348	3,101	575	950	12,988
RRC District 6	7,351	3,889	4,640	916	465	1,291	600	877	15,513
RRC District 7B	1,945	-107	331	58	4	190	0	149	2,148
RRC District 7C	6,915	44	1,269	1,144	81	408	1,578	589	8,400
RRC District 8	15,632	-434	5,142	1,291	471	1,144	5,561	1,651	23,632
RRC District 8A	1,318	-41	403	64	97	11	82	122	1,490
RRC District 9	7,661	-250	1,236	213	95	309	34	496	8,186
RRC District 10	6,237	-17	1,661	973	791	695	559	450	6,921
State Offshore	83	5	0	31	0	0	0	10	47

**Table 10. Total natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017 (cont.)**

billion cubic feet

State and subdivision	Changes in reserves during 2017								
	Published proved reserves 12/31/16	Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	Proved reserves 12/31/17
Utah	3,621	-260	849	278	134	280	123	312	3,889
Virginia	2,447	-15	457	31	3	0	1	115	2,741
West Virginia	24,745	585	2,283	4,586	1,279	2,053	13,655	1,601	35,855
Wyoming	21,533	1,076	3,498	1,404	3,060	1,744	685	1,720	22,352
<b>Federal Offshore</b>	<b>6,564</b>	<b>389</b>	<b>1,346</b>	<b>889</b>	<b>142</b>	<b>47</b>	<b>221</b>	<b>1,064</b>	<b>6,472</b>
Pacific (California)	30	9	2	2	0	0	0	4	35
Gulf of Mexico (Central and Eastern) <sup>a</sup>	5,722	364	1,206	718	58	47	219	913	5,869
Gulf of Mexico (Western)	812	16	138	169	84	0	2	147	568
Miscellaneous <sup>b</sup>	117	102	13	9	47	3	0	9	170
<b>U.S. Total</b>	<b>341,133</b>	<b>19,326</b>	<b>72,947</b>	<b>31,629</b>	<b>24,916</b>	<b>47,039</b>	<b>70,783</b>	<b>30,391</b>	<b>464,292</b>

<sup>a</sup> Includes Federal Offshore Louisiana, Alabama, Mississippi, and Florida.<sup>b</sup> M – Miscellaneous states include Arizona, Florida, Idaho, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for natural gas for 2017 contained in the *Natural Gas Annual 2017*, DOE/EIA-0131(17). Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

See EIA Natural Gas Data at <http://www.eia.gov/naturalgas/data.cfm>Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

**Table 11. Nonassociated natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017**

billion cubic feet

## Changes in reserves during 2017

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017								Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)		
Alaska	1,014	-46	229	0	0	0	44	101	1,140	
<b>Lower 48 states</b>	<b>267,899</b>	<b>16,279</b>	<b>54,655</b>	<b>24,677</b>	<b>22,619</b>	<b>39,366</b>	<b>55,883</b>	<b>23,080</b>	<b>363,706</b>	
Alabama	1,766	173	43	77	485	165	18	140	1,463	
Arizona	M	M	M	M	M	M	M	M	M	
Arkansas	7,364	-68	865	118	8	0	869	691	8,213	
<b>California</b>	<b>121</b>	<b>5</b>	<b>41</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>22</b>	<b>167</b>	
Coastal Region Onshore	1	-1	0	0	0	0	0	0	0	
Los Angeles Basin Onshore	0	0	0	0	0	0	0	0	0	
San Joaquin Basin Onshore	118	7	41	1	0	0	23	22	166	
State Offshore	2	-1	0	0	0	0	0	0	1	
Colorado	10,808	3,256	1,965	1,262	1,361	4,352	494	1,028	17,224	
Florida	M	M	M	M	M	M	M	M	M	
Idaho	M	M	M	M	M	M	M	M	M	
Illinois	M	M	M	M	M	M	M	M	M	
Indiana	M	M	M	M	M	M	M	M	M	
Kansas	2,704	-40	200	126	498	412	0	180	2,472	
Kentucky	1,166	17	104	8	2	0	0	73	1,204	
<b>Louisiana</b>	<b>17,547</b>	<b>7,500</b>	<b>7,637</b>	<b>3,102</b>	<b>393</b>	<b>3,112</b>	<b>5,811</b>	<b>2,186</b>	<b>35,926</b>	
North	15,679	7,274	7,342	2,795	368	2,971	5,738	1,951	33,890	
South Onshore	1,587	236	287	257	24	141	73	198	1,845	
State Offshore	281	-10	8	50	1	0	0	37	191	
Maryland	M	M	M	M	M	M	M	M	M	
Michigan	1,238	250	53	73	1	54	0	90	1,431	
Mississippi	316	-49	20	7	3	72	0	30	319	
Missouri	M	M	M	M	M	M	M	M	M	
Montana	331	24	13	4	0	0	0	27	337	
Nebraska	M	M	M	M	M	M	M	M	M	
Nevada	M	M	M	M	M	M	M	M	M	
<b>New Mexico</b>	<b>8,724</b>	<b>-11</b>	<b>837</b>	<b>814</b>	<b>4,335</b>	<b>7,452</b>	<b>164</b>	<b>751</b>	<b>11,266</b>	
East	1,505	-63	413	238	51	55	164	189	1,596	
West	7,219	52	424	576	4,284	7,397	0	562	9,670	
New York	113	-10	34	26	5	0	0	11	95	
North Dakota	141	-68	76	0	0	0	0	19	130	
Ohio	15,647	117	7,575	1,877	1,254	2,883	5,475	1,773	26,793	
Oklahoma	25,912	1,581	1,529	3,794	876	200	2,647	1,692	25,507	
Oregon	M	M	M	M	M	M	M	M	M	
Pennsylvania	62,379	-633	13,211	2,959	5,534	8,080	21,584	5,453	90,675	
South Dakota	M	M	M	M	M	M	M	M	M	
Tennessee	M	M	M	M	M	M	M	M	M	
<b>Texas</b>	<b>58,231</b>	<b>2,254</b>	<b>13,514</b>	<b>3,984</b>	<b>3,362</b>	<b>8,578</b>	<b>4,586</b>	<b>4,989</b>	<b>74,828</b>	
RRC District 1	3,159	-10	275	388	651	1,166	588	304	3,835	
RRC District 2 Onshore	2,707	78	491	178	112	74	511	367	3,204	
RRC District 3 Onshore	1,424	-66	514	43	47	97	190	190	1,879	
RRC District 4 Onshore	14,795	154	2,873	338	797	1,721	586	1,077	17,917	
RRC District 5	11,102	-620	646	861	344	3,100	575	913	12,685	
RRC District 6	7,180	3,845	4,574	907	464	1,291	600	807	15,312	
RRC District 7B	1,753	-114	328	35	2	178	0	134	1,974	
RRC District 7C	1,364	-336	323	102	23	91	0	106	1,211	
RRC District 8	2,907	-500	880	143	79	31	1,005	320	3,781	
RRC District 8A	49	45	0	47	1	0	0	5	41	
RRC District 9	6,469	-219	1,203	206	95	309	33	393	7,101	
RRC District 10	5,239	-8	1,407	705	747	520	498	363	5,841	
State Offshore	83	5	0	31	0	0	0	10	47	

**Table 11. Nonassociated natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017 (cont.)**

billion cubic feet

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Estimated production (-)	Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)			
Utah	2,897	-78	753	240	119	200	58	247	3,224	
Virginia	2,447	-15	457	31	3	0	1	115	2,741	
West Virginia	24,720	587	2,283	4,586	1,279	2,053	13,655	1,599	35,834	
Wyoming	20,530	1,363	3,257	1,342	3,059	1,743	464	1,644	21,312	
<b>Federal Offshore</b>	<b>2,700</b>	<b>125</b>	<b>180</b>	<b>237</b>	<b>8</b>	<b>10</b>	<b>34</b>	<b>312</b>	<b>2,492</b>	
Pacific (California)	0	0	0	0	0	0	0	0	0	
Gulf of Mexico (Central and Eastern) <sup>a</sup>	2,474	112	150	163	8	10	34	274	2,335	
Gulf of Mexico (Western)	226	13	30	74	0	0	0	38	157	
Miscellaneous <sup>b</sup>	97	-1	8	9	34	0	0	8	53	
<b>U.S. Total</b>	<b>268,913</b>	<b>16,233</b>	<b>54,884</b>	<b>24,677</b>	<b>22,619</b>	<b>39,366</b>	<b>55,927</b>	<b>23,181</b>	<b>364,846</b>	

<sup>a</sup> Includes Federal Offshore Louisiana, Alabama, Mississippi, and Florida.<sup>b</sup> M – Miscellaneous states include Arizona, Florida, Idaho, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for nonassociated natural gas for 2017 contained in the *Natural Gas Annual 2017*, DOE/EIA-0131(17). Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

See EIA Natural Gas Data at <http://www.eia.gov/naturalgas/data.cfm>Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

**Table 12. Associated-dissolved natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017**

billion cubic feet

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	
Alaska	2,327	366	2,977	0	0	0	6	242	5,434
<b>Lower 48 states</b>	<b>69,893</b>	<b>2,727</b>	<b>15,086</b>	<b>6,952</b>	<b>2,297</b>	<b>7,673</b>	<b>14,850</b>	<b>6,968</b>	<b>94,012</b>
Alabama	89	-37	41	3	0	1	0	12	79
Arizona	M	M	M	M	M	M	M	M	M
Arkansas	56	5	4	0	0	0	0	6	59
<b>California</b>	<b>1,312</b>	<b>83</b>	<b>292</b>	<b>122</b>	<b>16</b>	<b>17</b>	<b>57</b>	<b>127</b>	<b>1,496</b>
Coastal Region Onshore	202	-8	33	23	0	0	3	10	197
Los Angeles Basin Onshore	35	22	8	4	16	17	0	6	56
San Joaquin Basin Onshore	989	121	239	95	0	0	51	108	1,197
State Offshore	86	-52	12	0	0	0	3	3	46
Colorado	8,278	1,260	1,171	650	154	876	1,394	672	11,503
Florida	1	-1	M	M	M	M	M	M	M
Idaho	M	M	M	M	M	M	M	M	M
Illinois	M	M	M	M	M	M	M	M	M
Indiana	M	M	M	M	M	M	M	M	M
Kansas	337	114	58	55	0	0	1	30	425
Kentucky	33	6	1	21	0	0	0	2	17
<b>Louisiana</b>	<b>525</b>	<b>66</b>	<b>148</b>	<b>144</b>	<b>25</b>	<b>32</b>	<b>12</b>	<b>59</b>	<b>555</b>
North	83	102	8	21	0	0	0	13	159
South Onshore	371	-16	133	121	22	32	12	37	352
State Offshore	71	-20	7	2	3	0	0	9	44
Maryland	M	M	M	M	M	M	M	M	M
Michigan	63	11	14	1	1	0	0	8	78
Mississippi	43	3	2	6	2	1	0	9	32
Missouri	M	M	M	M	M	M	M	M	M
Montana	255	-2	62	2	2	0	4	21	294
<b>New Mexico</b>	<b>5,648</b>	<b>214</b>	<b>769</b>	<b>308</b>	<b>146</b>	<b>2,315</b>	<b>1,668</b>	<b>568</b>	<b>9,592</b>
East	5,363	202	701	257	126	2,281	1,503	529	9,138
West	285	12	68	51	20	34	165	39	454
Nebraska	M	M	M	M	M	M	M	M	M
Nevada	M	M	M	M	M	M	M	M	M
New York	7	-1	4	0	0	0	0	1	9
North Dakota	8,470	-84	1,683	333	241	3	1,426	678	10,246
Ohio	298	63	74	171	51	35	0	20	228
Oklahoma	8,484	594	2,413	1,466	295	1,662	2,444	794	13,042
Oregon	M	M	M	M	M	M	M	M	M
Pennsylvania	277	-46	7	0	106	0	0	19	113
South Dakota	M	M	M	M	M	M	M	M	M
Tennessee	M	M	M	M	M	M	M	M	M
<b>Texas</b>	<b>30,081</b>	<b>583</b>	<b>6,835</b>	<b>2,918</b>	<b>1,095</b>	<b>2,610</b>	<b>7,371</b>	<b>3,046</b>	<b>40,421</b>
RRC District 1	4,821	-55	301	176	390	689	681	399	5,472
RRC District 2 Onshore	2,258	104	175	98	9	107	392	329	2,600
RRC District 3 Onshore	628	-62	376	52	72	185	16	66	953
RRC District 4 Onshore	224	-65	8	71	27	0	4	9	64
RRC District 5	52	290	8	7	4	1	0	37	303
RRC District 6	171	44	66	9	1	0	0	70	201
RRC District 7B	192	7	3	23	2	12	0	15	174
RRC District 7C	5,551	380	946	1,042	58	317	1,578	483	7,189
RRC District 8	12,725	66	4,262	1,148	392	1,113	4,556	1,331	19,851
RRC District 8A	1,269	-86	403	17	96	11	82	117	1,449
RRC District 9	1,192	-31	33	7	0	0	1	103	1,085
RRC District 10	998	-9	254	268	44	175	61	87	1,080
State Offshore	0	0	0	0	0	0	0	0	0

**Table 12. Associated-dissolved natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017 (cont.)**

billion cubic feet

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Estimated production (-)	Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)			
Utah	724	-182	96	38	15	80	65	65	665	
Virginia	M	M	M	M	M	M	M	M	M	
West Virginia	25	-2	0	0	0	0	0	2	21	
Wyoming	1,003	-287	241	62	1	1	221	76	1,040	
<b>Federal Offshore</b>	<b>3,864</b>	<b>264</b>	<b>1,166</b>	<b>652</b>	<b>134</b>	<b>37</b>	<b>187</b>	<b>752</b>	<b>3,980</b>	
Pacific (California)	30	9	2	2	0	0	0	4	35	
Gulf of Mexico (Central and Eastern) <sup>a</sup>	3,248	252	1,056	555	50	37	185	639	3,534	
Gulf of Mexico (Western)	586	3	108	95	84	0	2	109	411	
Miscellaneous <sup>b</sup>	20	103	5	0	13	3	0	1	117	
<b>U.S. Total</b>	<b>72,220</b>	<b>3,093</b>	<b>18,063</b>	<b>6,952</b>	<b>2,297</b>	<b>7,673</b>	<b>14,856</b>	<b>7,210</b>	<b>99,446</b>	

<sup>a</sup> Includes Federal Offshore Louisiana, Alabama, Mississippi, and Florida.<sup>b</sup> M – Miscellaneous states include Arizona, Florida, Idaho, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, Tennessee, and Virginia.

Notes: The production estimates in this table are based on data reported on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. They may differ slightly from the official U.S. EIA production data for associated-dissolved natural gas for 2017 contained in the *Natural Gas Annual 2017*, DOE/EIA-0131(17). Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

See EIA Natural Gas Data at <http://www.eia.gov/naturalgas/data.cfm>Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

**Table 13. Shale natural gas proved reserves and production, 2014–17**

billion cubic feet

State and subdivision	Reserves				Production			
	2014	2015	2016	2017	2014	2015	2016	2017
Alaska	0	0	0	0	0	0	0	0
<b>Lower 48 states</b>	<b>199,684</b>	<b>175,601</b>	<b>209,809</b>	<b>307,903</b>	<b>13,447</b>	<b>15,213</b>	<b>17,032</b>	<b>18,589</b>
Arkansas	11,695	7,164	6,262	7,090	1,038	923	733	618
<b>California</b>	<b>44</b>	<b>31</b>	<b>41</b>	<b>62</b>	<b>3</b>	<b>2</b>	<b>6</b>	<b>6</b>
Coastal Region Onshore	9	8	0	0	1	1	1	0
San Joaquin Basin Onshore	15	12	41	62	1	1	5	6
State Offshore	20	11	0	0	1	0	0	0
Colorado	3,775	3,115	2,032	1,885	236	325	164	97
Florida	0	0	0	0	0	0	0	0
Indiana	M	M	M	M	M	M	M	M
Kansas	4	5	0	0	1	1	0	0
Kentucky	50	13	12	M	2	1	0	M
<b>Louisiana</b>	<b>12,792</b>	<b>9,154</b>	<b>9,637</b>	<b>26,484</b>	<b>1,191</b>	<b>1,153</b>	<b>1,111</b>	<b>1,450</b>
North	12,611	8,972	9,570	26,316	1,169	1,129	1,085	1,414
South	181	182	67	168	22	24	26	36
State Offshore	0	0	0	0	0	0	0	0
Michigan	1,432	1,006	1,128	942	96	65	84	63
Mississippi	19	11	7	8	2	3	2	2
Missouri	M	M	M	M	M	M	M	M
Montana	482	360	213	258	42	39	19	18
New Mexico	646	1,044	5,581	9,451	28	46	497	592
New York	M	M	M	M	M	M	M	M
North Dakota	6,442	6,904	8,259	9,984	426	545	582	664
Ohio	6,384	12,430	15,472	26,468	441	959	1,386	1,747
Oklahoma	16,653	18,672	20,327	22,675	869	993	1,082	1,290
Pennsylvania	56,210	53,484	60,979	89,478	4,009	4,597	5,049	5,365
South Dakota	M	M	M	M	M	M	M	M
Tennessee	M	M	M	M	M	M	M	M
<b>Texas</b>	<b>54,158</b>	<b>42,626</b>	<b>56,577</b>	<b>78,666</b>	<b>4,156</b>	<b>4,353</b>	<b>5,029</b>	<b>5,171</b>
RRC District 1	11,729	10,503	7,493	8,895	822	892	690	652
RRC District 2 Onshore	6,648	4,445	4,126	4,900	649	793	642	584
RRC District 3 Onshore	106	125	125	744	10	17	23	23
RRC District 4 Onshore	4,991	4,558	11,001	12,861	381	500	706	677
RRC District 5	13,043	8,228	8,321	10,636	1,022	903	827	730
RRC District 6	3,979	3,474	3,249	8,909	270	238	339	333
RRC District 7B	2,204	1,329	1,562	1,736	165	143	116	110
RRC District 7C	1,183	1,350	5,661	7,156	111	140	451	494
RRC District 8	1,125	736	7,924	15,317	78	109	730	1,115
RRC District 8A	10	4	8	50	1	3	0	1
RRC District 9	9,074	7,824	7,107	7,462	639	608	505	452
RRC District 10	66	50	0	0	8	7	0	0
State Offshore	0	0	0	0	0	0	0	0
Utah	M	M	M	M	M	M	M	M
Virginia	84	76	45	66	3	3	4	4
West Virginia	28,311	19,226	23,146	34,296	869	1,163	1,270	1,486
Wyoming	380	204	17	28	29	36	5	6
Federal Offshore	0	0	0	0	0	0	0	0
Miscellaneous <sup>a</sup>	123	76	74	62	6	6	9	10
<b>U.S. Total</b>	<b>199,684</b>	<b>175,601</b>	<b>209,809</b>	<b>307,903</b>	<b>13,447</b>	<b>15,213</b>	<b>17,032</b>	<b>18,589</b>

<sup>a</sup>M – Miscellaneous states include Indiana, Kentucky, Missouri, New York, South Dakota, Tennessee, and Utah.

Notes: The above table is based on shale natural gas proved reserves and production volumes reported and imputed from data on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. For certain reasons (e.g. incorrect or incomplete respondent submissions, respondent mis-identification of shale versus non-shale reservoirs) the actual proved reserves and production of natural gas from shales may be higher or lower. The production estimates are provided as an indicator of production trends and may differ slightly from official U.S. EIA production volumes listed elsewhere on the U.S. EIA web page. Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves, 2014–17*



**Table 14. Shale natural gas proved reserves, reserves changes, and production, wet after lease separation, 2017**

billion cubic feet

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Estimated production (-)	Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)			
Alaska	0	0	0	0	0	0	0	0	0	0
<b>Lower 48 states</b>	<b>209,809</b>	<b>10,494</b>	<b>46,655</b>	<b>18,329</b>	<b>10,947</b>	<b>28,040</b>	<b>60,770</b>	<b>18,589</b>	<b>307,903</b>	
Arkansas	6,262	-8	724	106	0	0	836	618	7,090	
<b>California</b>	<b>41</b>	<b>-25</b>	<b>52</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>62</b>	
Coastal Region Onshore	0	0	0	0	0	0	0	0	0	
San Joaquin Basin Onshore	41	-25	52	0	0	0	0	6	62	
State Offshore	0	0	0	0	0	0	0	0	0	
Colorado	2,032	-409	190	86	226	221	260	97	1,885	
Indiana	M	M	M	M	M	M	M	M	M	
Kansas	0	0	0	0	0	0	0	0	0	
Kentucky	12	-12	M	M	M	M	M	M	M	
<b>Louisiana</b>	<b>9,637</b>	<b>7,227</b>	<b>5,831</b>	<b>2,040</b>	<b>308</b>	<b>2,931</b>	<b>4,656</b>	<b>1,450</b>	<b>26,484</b>	
North Onshore	9,570	7,290	5,634	2,040	308	2,931	4,653	1,414	26,316	
South Onshore	67	-63	197	0	0	0	3	36	168	
Michigan	1,128	-158	21	40	0	54	0	63	942	
Mississippi	7	2	4	1	2	0	0	2	8	
Missouri	M	M	M	M	M	M	M	M	M	
Montana	213	3	58	1	0	0	3	18	258	
New Mexico	5,581	211	920	418	225	2,400	1,574	592	9,451	
New York	M	M	M	M	M	M	M	M	M	
North Dakota	8,259	-118	1,638	315	231	1	1,414	664	9,984	
Ohio	15,472	103	7,507	1,898	1,283	2,919	5,395	1,747	26,468	
Oklahoma	20,327	1,215	1,265	2,499	278	1,277	2,658	1,290	22,675	
Pennsylvania	60,979	-196	12,967	2,893	5,488	8,080	21,394	5,365	89,478	
South Dakota	M	M	M	M	M	M	M	M	M	
Tennessee	M	M	M	M	M	M	M	M	M	
<b>Texas</b>	<b>56,577</b>	<b>2,139</b>	<b>13,453</b>	<b>3,573</b>	<b>1,990</b>	<b>8,104</b>	<b>9,127</b>	<b>5,171</b>	<b>78,666</b>	
RRC District 1	7,493	-77	508	530	947	1,855	1,245	652	8,895	
RRC District 2 Onshore	4,126	132	517	172	21	84	818	584	4,900	
RRC District 3 Onshore	125	47	459	1	55	184	8	23	744	
RRC District 4 Onshore	11,001	-40	1,944	121	162	372	544	677	12,861	
RRC District 5	8,321	-245	492	493	309	3,090	510	730	10,636	
RRC District 6	3,249	2,126	2,962	672	49	1,228	398	333	8,909	
RRC District 7B	1,562	-143	283	24	1	169	0	110	1,736	
RRC District 7C	5,661	166	1,063	883	43	268	1,418	494	7,156	
RRC District 8	7,924	361	4,077	471	314	740	4,115	1,115	15,317	
RRC District 8A	8	3	2	0	0	0	38	1	50	
RRC District 9	7,107	-191	1,146	206	89	114	33	452	7,462	
RRC District 10	0	0	0	0	0	0	0	0	0	
Utah	M	M	M	M	M	M	M	M	M	
Virginia	45	8	17	0	0	0	0	4	66	
West Virginia	23,146	479	1,994	4,458	872	2,053	13,440	1,486	34,296	
Wyoming	17	3	1	0	0	0	13	6	28	
Federal Offshore	0	0	0	0	0	0	0	0	0	
Miscellaneous <sup>a</sup>	74	30	13	1	44	0	0	10	62	
<b>U.S. Total</b>	<b>209,809</b>	<b>10,494</b>	<b>46,655</b>	<b>18,329</b>	<b>10,947</b>	<b>28,040</b>	<b>60,770</b>	<b>18,589</b>	<b>307,903</b>	

<sup>a</sup> M – Miscellaneous states include Indiana, Kentucky, Missouri, New York, South Dakota, Tennessee, and Utah.

Notes: The above table is based on shale natural gas proved reserves and production volumes reported and imputed from data on Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*. For certain reasons (e.g. incorrect or incomplete respondent submissions, respondent mis-identification of shale versus non-shale reservoirs) the actual proved reserves and production of natural gas from shales may be higher or lower. The production estimates are provided as an indicator of production trends and may differ slightly from official U.S. EIA production volumes listed elsewhere on the U.S. EIA web page. Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

Table 15. Coalbed methane proved reserves and production, 2014–17

billion cubic feet

State and subdivision	Reserves				Production			
	2014	2015	2016	2017	2014	2015	2016	2017
Alaska	0	0	0	0	0	0	0	0
<b>Lower 48 states</b>	<b>15,696</b>	<b>12,517</b>	<b>10,585</b>	<b>11,878</b>	<b>1,404</b>	<b>1,269</b>	<b>1,020</b>	<b>980</b>
Alabama	978	975	985	789	78	72	45	62
Arkansas	15	5	9	10	2	1	1	1
California	0	0	0	0	0	0	0	0
Colorado	5,103	4,394	3,265	3,275	412	392	352	338
Florida	0	0	0	0	0	0	0	0
Illinois	M	M	M	M	M	M	M	M
Indiana	M	M	M	M	M	M	M	M
Kansas	211	170	55	46	27	25	11	15
Kentucky	7	6	6	M	0	0	0	M
<b>Louisiana</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
North	0	0	1	0	0	0	0	0
South Onshore	0	0	0	0	0	0	0	0
State Offshore	0	0	0	0	0	0	0	0
Michigan	0	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0	0	0	0
Montana	11	3	7	1	0	0	0	0
New Mexico	4,120	3,189	2,210	3,175	373	344	253	234
New York	0	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0	0
Ohio	M	M	M	M	M	M	M	M
Oklahoma	602	328	320	318	61	48	43	36
Pennsylvania	158	135	206	M	11	10	10	M
<b>Texas</b>	<b>61</b>	<b>63</b>	<b>84</b>	<b>74</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>8</b>
RRC District 1	0	0	1	1	0	0	1	0
RRC District 2 Onshore	4	4	2	2	1	1	0	0
RRC District 3 Onshore	49	53	72	63	7	8	9	7
RRC District 4 Onshore	1	1	1	1	0	0	0	0
RRC District 5	0	0	0	0	0	0	0	0
RRC District 6	0	0	0	0	0	0	0	0
RRC District 7B	0	0	1	1	0	0	0	0
RRC District 7C	0	0	0	0	0	0	0	0
RRC District 8	0	0	0	0	0	0	0	0
RRC District 8A	0	0	0	0	0	0	0	0
RRC District 9	0	0	0	0	0	0	0	0
RRC District 10	7	5	7	6	1	1	1	1
State Offshore	0	0	0	0	0	0	0	0
Utah	538	352	332	438	47	42	39	36
Virginia	2,233	2,060	2,117	2,465	108	106	102	99
West Virginia	76	68	99	89	11	11	9	7
Wyoming	1,572	760	882	1,014	264	207	143	135
Federal Offshore	0	0	0	0	0	0	0	0
Miscellaneous <sup>a</sup>	11	9	7	184	1	1	1	9
<b>U.S. Total</b>	<b>15,696</b>	<b>12,517</b>	<b>10,585</b>	<b>11,878</b>	<b>1,404</b>	<b>1,269</b>	<b>1,020</b>	<b>980</b>

<sup>a</sup> M - Miscellaneous states include Kentucky, Illinois, Indiana, Ohio, and Pennsylvania.

Notes: Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves, 2014–17*

Table 16. Coalbed methane proved reserves, reserves changes, and production, 2017

billion cubic feet

State and subdivision	Published proved reserves 12/31/16	Changes in reserves during 2017							Proved reserves 12/31/17
		Adjustments (+,-)	Revision increases (+)	Revision decreases (-)	Sales (-)	Acquisitions (+)	Extensions & discoveries (+)	Estimated production (-)	
Alaska	0	0	0	0	0	0	0	0	0
<b>Lower 48 states</b>	<b>10,585</b>	<b>367</b>	<b>1,266</b>	<b>590</b>	<b>1,637</b>	<b>2,830</b>	<b>37</b>	<b>980</b>	<b>11,878</b>
Alabama	985	188	8	10	485	165	0	62	789
Arkansas	9	0	2	0	0	0	0	1	10
California	0	0	0	0	0	0	0	0	0
Colorado	3,265	21	268	260	183	472	30	338	3,275
Florida	0	0	0	0	0	0	0	0	0
Illinois	M	M	M	M	M	M	M	M	M
Indiana	M	M	M	M	M	M	M	M	M
Kansas	55	23	5	0	22	0	0	15	46
Kentucky	6	-6	M	M	M	M	M	M	M
<b>Louisiana</b>	<b>1</b>	<b>-1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
North Onshore	1	-1	0	0	0	0	0	0	0
South Onshore	0	0	0	0	0	0	0	0	0
State Offshore	0	0	0	0	0	0	0	0	0
Michigan	0	0	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0	0	0	0	0
Montana	7	-4	0	2	0	0	0	0	1
New Mexico	2,210	92	204	273	828	2,004	0	234	3,175
New York	0	0	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0	0	0
Ohio	M	M	M	M	M	M	M	M	M
Oklahoma	320	-8	42	0	0	0	0	36	318
Pennsylvania	206	-206	M	M	M	M	M	M	M
<b>Texas</b>	<b>84</b>	<b>-2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>74</b>
RRC District 1	1	0	0	0	0	0	0	0	1
RRC District 2 Onshore	2	0	0	0	0	0	0	0	2
RRC District 3 Onshore	72	-2	0	0	0	0	0	7	63
RRC District 4 Onshore	1	0	0	0	0	0	0	0	1
RRC District 5	0	0	0	0	0	0	0	0	0
RRC District 6	0	0	0	0	0	0	0	0	0
RRC District 7B	1	0	0	0	0	0	0	0	1
RRC District 7C	0	0	0	0	0	0	0	0	0
RRC District 8	0	0	0	0	0	0	0	0	0
RRC District 8A	0	0	0	0	0	0	0	0	0
RRC District 9	0	0	0	0	0	0	0	0	0
RRC District 10	7	0	0	0	0	0	0	1	6
State Offshore	0	0	0	0	0	0	0	0	0
Utah	332	26	46	0	119	189	0	36	438
Virginia	2,117	71	405	30	0	0	1	99	2,465
West Virginia	99	-6	13	10	0	0	0	7	89
Wyoming	882	5	261	5	0	0	6	135	1,014
Federal Offshore	0	0	0	0	0	0	0	0	0
Miscellaneous <sup>a</sup>	7	174	12	0	0	0	0	9	184
<b>U.S. Total</b>	<b>10,585</b>	<b>367</b>	<b>1,266</b>	<b>590</b>	<b>1,637</b>	<b>2,830</b>	<b>37</b>	<b>980</b>	<b>11,878</b>

<sup>a</sup> M – Miscellaneous states include Illinois, Indiana, Kentucky, Ohio, and Pennsylvania.

Notes: Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*

Table 17. Estimated natural gas plant liquids and dry natural gas proved reserves, 2017

million barrels and billion cubic feet

State and subdivision	Total natural gas proved reserves		Estimated proved reserves	
	2017		Natural gas plant liquids	Dry natural gas
	billion cubic feet		million barrels	billion cubic feet
Alaska	6,574		246	6,521
<b>Lower 48 states</b>	<b>457,718</b>		<b>18,997</b>	<b>431,939</b>
Alabama	1,542		26	1,510
Arizona	M		M	M
Arkansas	8,272		4	8,267
<b>California</b>	<b>1,663</b>		<b>78</b>	<b>1,560</b>
Coastal Region Onshore	197		8	187
Los Angeles Basin Onshore	56		3	54
San Joaquin Basin Onshore	1,363		67	1,273
State Offshore	47		0	46
Colorado	28,727		1,530	26,573
Florida	M		M	M
Idaho	M		M	M
Illinois	M		M	M
Indiana	M		M	M
Kansas	2,897		183	2,654
Kentucky	1,221		63	1,136
<b>Louisiana</b>	<b>36,481</b>		<b>281</b>	<b>36,119</b>
North	34,049		176	33,805
South Onshore	2,197		90	2,092
State Offshore	235		15	222
Maryland	M		M	M
Michigan	1,509		15	1,489
Mississippi	351		0	350
Missouri	M		M	M
Montana	631		15	611
Nebraska	M		M	M
Nevada	M		M	M
<b>New Mexico</b>	<b>20,858</b>		<b>1,044</b>	<b>19,365</b>
East	10,734		703	9,729
West	10,124		341	9,636
New York	104		0	104
North Dakota	10,376		1,377	8,445
Ohio	27,021		640	26,123
Oklahoma	38,549		2,143	35,491
Oregon	M		M	M
Pennsylvania	90,788		864	89,589
South Dakota	M		M	M
Tennessee	M		M	M
<b>Texas</b>	<b>115,249</b>		<b>7,584</b>	<b>105,618</b>
RRC District 1	9,307		265	8,928
RRC District 2 Onshore	5,804		1,296	4,775
RRC District 3 Onshore	2,832		219	2,506
RRC District 4 Onshore	17,981		379	17,429
RRC District 5	12,988		166	12,750
RRC District 6	15,513		473	14,840
RRC District 7B	2,148		237	1,860
RRC District 7C	8,400		632	7,490
RRC District 8	23,632		2,464	20,105
RRC District 8A	1,490		219	1,420
RRC District 9	8,186		598	7,312
RRC District 10	6,921		636	6,156
State Offshore	47		0	47
Utah	3,889		101	3,752
Virginia	2,741		0	2,741
West Virginia	35,855		2,089	32,785
Wyoming	22,352		574	21,549
<b>Federal Offshore</b>	<b>6,472</b>		<b>375</b>	<b>5,945</b>
Pacific (California)	35		0	34
Gulf of Mexico (Central and Eastern) <sup>a</sup>	5,869		355	5,372
Gulf of Mexico (Western)	568		20	539
Miscellaneous <sup>b</sup>	165		11	163
<b>U.S. Total</b>	<b>464,292</b>		<b>19,243</b>	<b>438,460</b>

<sup>a</sup> Includes Federal Offshore Louisiana, Mississippi, Alabama, and Florida.<sup>b</sup> M – Miscellaneous states include Arizona, Florida, Idaho, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Notes: One barrel = 42 U.S. gallons. Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*, and Form EIA-64A, *Annual Report of the Origin of Natural Gas Liquids Production*

**Table 18. Reported proved nonproducing reserves of crude oil, lease condensate, nonassociated gas, associated-dissolved gas, and total gas, wet after lease separation, 2017**

State and subdivision	Crude oil (million barrels)	Lease condensate (million barrels)	Nonassociated gas (billion cubic feet)	Associated- dissolved gas (billion cubic feet)	Total Gas (billion cubic feet)
Alaska	317	0	465	79	544
<b>Lower 48 states</b>	<b>15,742</b>	<b>1,225</b>	<b>125,095</b>	<b>41,847</b>	<b>166,942</b>
Alabama	7	2	35	17	52
Arizona	M	M	M	M	M
Arkansas	2	0	1,099	7	1,106
<b>California</b>	<b>497</b>	<b>0</b>	<b>65</b>	<b>391</b>	<b>455</b>
Coastal Region Onshore	213	0	0	94	94
Los Angeles Basin Onshore	22	0	0	3	3
San Joaquin Basin Onshore	213	0	64	279	343
State Offshore	50	0	1	14	15
Colorado	981	18	5,277	7,346	12,622
Florida	M	M	M	M	M
Idaho	M	M	M	M	M
Illinois	M	M	M	M	M
Indiana	M	M	M	M	M
Kansas	19	8	188	127	315
Kentucky	0	0	4	0	4
<b>Louisiana</b>	<b>151</b>	<b>42</b>	<b>20,876</b>	<b>165</b>	<b>21,041</b>
North	5	14	19,838	4	19,842
South Onshore	133	28	1,026	152	1,178
State Offshore	13	0	13	8	21
Maryland	M	M	M	M	M
Michigan	8	3	16	14	30
Mississippi	34	0	91	1	92
Missouri	M	M	M	M	M
Montana	72	0	1	81	82
Nebraska	M	M	M	M	M
Nevada	M	M	M	M	M
<b>New Mexico</b>	<b>1,586</b>	<b>35</b>	<b>1,495</b>	<b>5,521</b>	<b>7,016</b>
East	1,565	33	243	5,439	5,682
West	21	2	1,252	82	1,334
New York	0	0	8	0	8
North Dakota	2,374	0	0	4,395	4,395
Ohio	12	69	12,741	68	12,809
Oklahoma	724	144	8,976	5,942	14,919
Oregon	M	M	M	M	M
Pennsylvania	0	37	25,136	0	25,136
South Dakota	M	M	M	M	M
Tennessee	M	M	M	M	M
<b>Texas</b>	<b>7,110</b>	<b>610</b>	<b>27,346</b>	<b>15,889</b>	<b>43,235</b>
RRC District 1	1,140	78	1,887	2,372	4,259
RRC District 2 Onshore	627	213	1,261	1,165	2,426
RRC District 3 Onshore	457	19	722	513	1,235
RRC District 4 Onshore	2	139	8,785	5	8,790
RRC District 5	15	2	813	10	823
RRC District 6	10	59	9,190	13	9,203
RRC District 7B	19	1	271	28	299
RRC District 7C	538	0	94	2,098	2,192
RRC District 8	3,814	55	891	9,092	9,983
RRC District 8A	373	0	0	325	325
RRC District 9	31	7	1,199	4	1,203
RRC District 10	85	38	2,234	263	2,498
State Offshore	0	0	0	0	0
Utah	94	6	617	183	800
Virginia	0	0	446	0	446
West Virginia	0	111	15,651	0	15,651
Wyoming	207	74	3,849	330	4,180
<b>Federal Offshore</b>	<b>1,849</b>	<b>65</b>	<b>1,176</b>	<b>1,364</b>	<b>2,540</b>
Pacific (California)	4	0	0	6	6
Gulf of Mexico (Central and Eastern) <sup>a</sup>	1,781	63	1,135	1,267	2,402
Gulf of Mexico (Western)	64	2	41	91	132
Miscellaneous <sup>b</sup>	15	0	2	7	9
<b>U.S. Total</b>	<b>16,059</b>	<b>1,225</b>	<b>125,560</b>	<b>41,926</b>	<b>167,486</b>

<sup>a</sup> Includes Federal Offshore Louisiana, Mississippi, Alabama, and Florida.

<sup>b</sup> M – Miscellaneous states include Arizona, Florida, Idaho, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Notes: One barrel = 42 U.S. gallons. Natural gas is measured at 60 degrees Fahrenheit and atmospheric pressure base of 14.73 pounds per square inch absolute (psia).

Source: U.S. Energy Information Administration, Form EIA-23L, *Annual Report of Domestic Oil and Gas Reserves*