

(MMst = million short tons, bbl = barrels, and Mcf = million cubic feet.)

# Oil, Natural Gas, & Coal Resources in Wyoming

January 2019  
Summary Report

Wyoming State Geological Survey  
Erin A. Campbell, Director and State Geologist

Laramie, Wyoming  
phone: 307-766-2286  
email: [wsgs-info@wyo.gov](mailto:wsgs-info@wyo.gov)  
website: [www.wsgs.wyo.gov](http://www.wsgs.wyo.gov)



Intrepreting the past,  
providing for the future

Nationally,  
Wyoming ranks  
1st in coal  
production,  
6th in natural gas  
production,  
and 8th in crude  
oil production.

More information is  
available at:

[www.wsgs.wyo.gov/energy/energy](http://www.wsgs.wyo.gov/energy/energy)



## Oil and Natural Gas

### Current Trends

“Slow and steady” defined Wyoming’s 2017 and 2018 crude oil and natural gas markets. Oil prices recovered from the 2016 downturn and are in turn driving increased drilling and production. Wyoming oil production in 2017 was more than 75.5 million barrels (MMbbl) and is forecast to be more than 85 MMbbl in 2018. These production numbers represent increases of 4% and 20%, respectively, from 2016 totals. Although international and domestic factors such as Iran sanctions, OPEC production swings, and capacity limitations in the Permian Basin of Texas and New Mexico may affect national and state oil prices, Wyoming remains positioned as a significant oil producer.

Wyoming’s natural gas production continues to gradually decline, with just over 1.8 trillion cubic feet (Tcf) of gas produced in 2017, down from 1.84 Tcf in 2016. However, the U.S. Energy Information Administration (EIA) predicts national gas production will reach record highs in 2018 and 2019. This, coupled with below-five-year-average national gas inventories, moderate increases in gas prices, and shuttering of coal power plants, suggests that gas production may flatten or even increase in the coming years. Wyoming natural gas production for 2018 is estimated to return to 2016 levels.

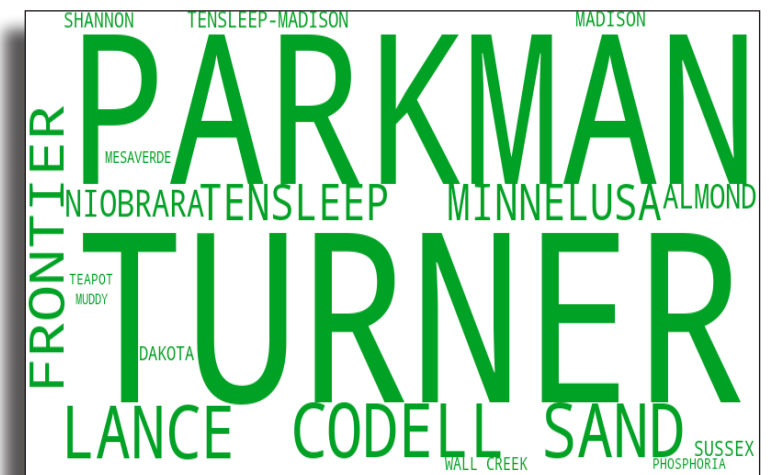
This optimistic outlook on Wyoming’s hydrocarbon production has prompted operators to begin competing for posi-

tion within the state’s oil and gas leases. In order to establish their spacing units, record numbers of applications for permits-to-drill (APDs) were submitted in 2017. More than 12,000 APDs (~11,100 oil; ~1,400 gas) were submitted to the Wyoming Oil and Gas Conservation Commission in 2017, and as of December 2018, the WOGCC has already received more than 14,800 oil and gas APDs. These are significant increases from the 7,900 APDs submitted in 2016.

### Looking Forward

*Powder River Basin*  
The Powder River Basin (PRB) continues to be the dominant oil-producing basin in Wyoming. Exploration and development of the PRB’s unconventional stacked Upper Cretaceous reservoirs accounted for 44% of Wyoming’s total 2017 oil production. Nearly a quarter of the state’s 2017 oil production came from the PRB Turner and Parkman sandstones alone.

New plays are expected to begin contributing to the PRB’s prolific oil production. Operators are starting to target the Mowry and Niobrara shales, with combined



July 2017–June 2018 Wyoming crude oil production per formation (larger font size denotes higher production).





July 2017–June 2018 Wyoming natural gas production per formation (larger font size denotes higher production).

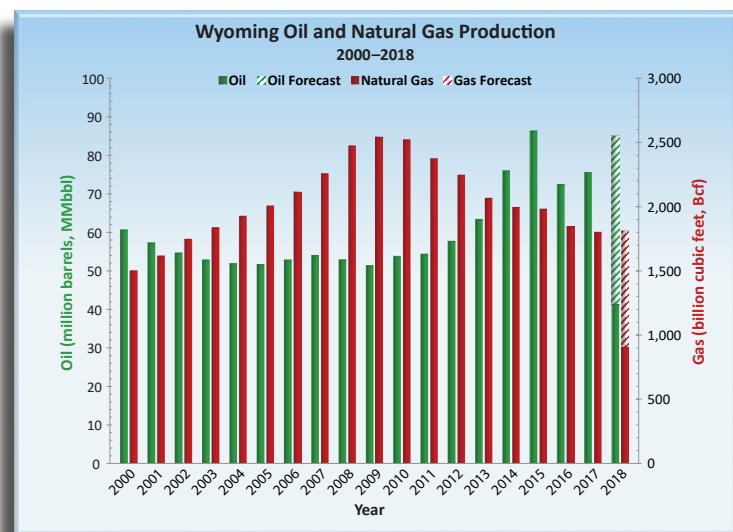
potential reserves for just one operator estimated at 1.87 billion barrels of oil equivalent.

Infrastructure expansions will also help the PRB compete on a national scale. Pipeline capacity will increase when the Iron Horse pipeline comes on line in 2019. This pipeline will transport crude oil from the PRB to Guernsey, Wyoming, and eventually to the major hub in Cushing, Oklahoma.

#### Federal development projects

The U.S. Bureau of Land Management in Wyoming has been moving several large oil and gas development projects through its permitting process. A record of decision was issued in August 2018 for the Normally Pressured Lance Natural Gas Development Project in the Greater Green River Basin near the Jonah and Pinedale fields. This decision allows Jonah Energy to complete up to 3,500 wells in the Lance Formation over the next 10 years.

A draft environmental impact statement for the Converse County Oil and Gas Project was issued in January 2018,

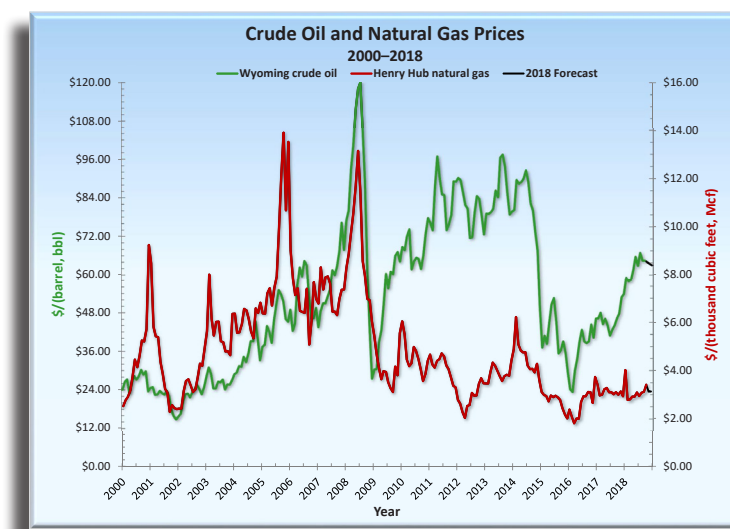


Annual Wyoming oil and natural gas production, 2000–2018 (actual production through June 2018).

with a final environmental impact statement anticipated in the last quarter of 2018 and a record of decision in early 2019. Multiple operators plan to drill up to 5,000 oil and gas wells in the stacked Upper Cretaceous reservoirs in northern and central Converse County.

#### Horizontal well development in Pinedale and Jonah fields

In 2017, Pinedale and Jonah fields combined accounted for 38% of all natural gas production in Wyoming (27% Pinedale, 11% Jonah). As of early 2018, operators are starting to drill successful horizontal gas wells on the flank of the Pinedale Anticline. In March 2018, a horizontal well in the Pinedale field produced 54.5 million cubic feet equivalent per day during a 24-hour initial production period, which is about seven times more natural gas per day than a normal directional well in Pinedale. Horizontal wells have been approved for Jonah, and the first wells are slated to be drilled in late 2018.



Crude oil and natural gas prices, 2000–2018.

### Oil and Natural Gas Projects

The Wyoming State Geological Survey (WSGS) strives to assist the public, government, and industry in understanding the state’s oil and gas resources.

Selected WSGS oil and natural gas publications (available as free downloads at [www.wsgs.wyo.gov/energy/energy](http://www.wsgs.wyo.gov/energy/energy)):

- Interactive Oil and Gas Map of Wyoming
- Stratigraphy and Hydrocarbon Potential of the Fort Union and Lance Formations in the Great Divide and Washakie Basins, South-Central Wyoming, Report of Investigations No. 73
- Codell Sandstone Oil Production Trends, Northern Denver Basin, Laramie County, Wyoming, Open File Report 2017-2
- Correlation of the Upper Cretaceous Strata of Wyoming, Open File Report 2017-3
- Evaluation of the Wall Creek and Turner Sandstone Reservoirs, Powder River Basin, Wyoming (anticipated early 2019)
- WSGS Subsurface Database (PRB data anticipated early 2019)

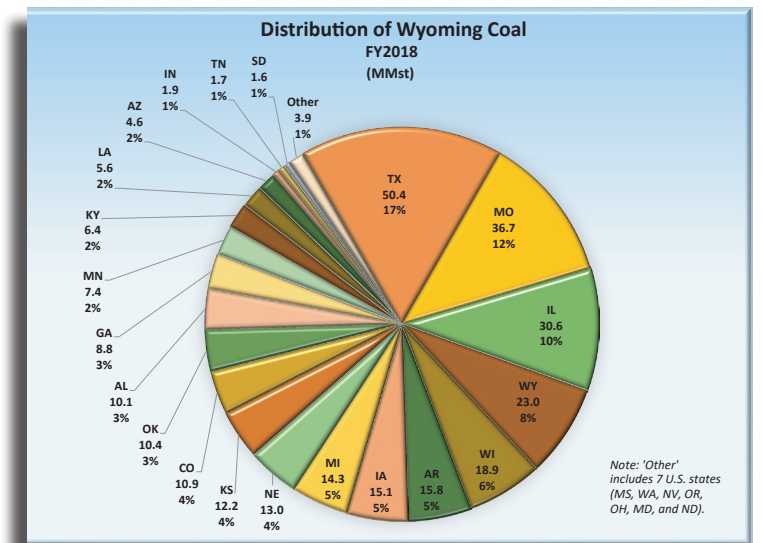
## Coal

### Current Trends

Wyoming has been the lead coal-producing state in the United States since 1986. Despite fluctuations in annual output, Wyoming coal production consistently accounts for about 40% of all U.S. coal produced in a year. The largest use of Wyoming coal is generating electricity at coal-fired power plants. Minor amounts are sent to industrial plants and commercial plants. During fiscal year 2018, 28 states received Wyoming coal for electricity generation; Texas, Missouri, and Illinois were the largest recipients.

In 2018, Wyoming is forecast to produce approximately 300 million short tons (MMst) of coal, a decrease from the previous year’s 316 MMst. This reduction is due to decreased demand for thermal coal used to generate electricity, driven by two major factors. First, in 2018, multiple coal-fired electricity generators that sourced Wyoming coal were retired across America. Second, the low price of natural gas has made it a more economic choice than coal for electricity generation, contributing to the rise of natural gas-fired generators as the primary electricity source in the United States.

This lower demand and increasingly competitive marketplace is part of the new normal for Wyoming’s coal industry, and in 2018, companies responded. Contura Energy sold its Wyoming assets, the Belle Ayr and Eagle Buttes mines, to Blackjewel Mining at the beginning of the year. In October, Westmoreland Coal Company, the owner of the Kemmerer mine in Lincoln County, filed for bankruptcy and began the restructuring process, leaving the future of the Kemmerer mine uncertain. Cloud Peak Energy, owner



Distribution of Wyoming coal to other states in fiscal year 2018 (July 2017–June 2018). All values in millions of short tons. (Source: EIA, 2018).

of the Antelope and Cordero Rojo mines, announced that it has begun a review of “strategic alternatives” to determine the future direction of the company, which may include selling assets. These developments, and the retirement of additional coal-fired power plants, are setting 2019 up to be another year of change for the coal industry in Wyoming.

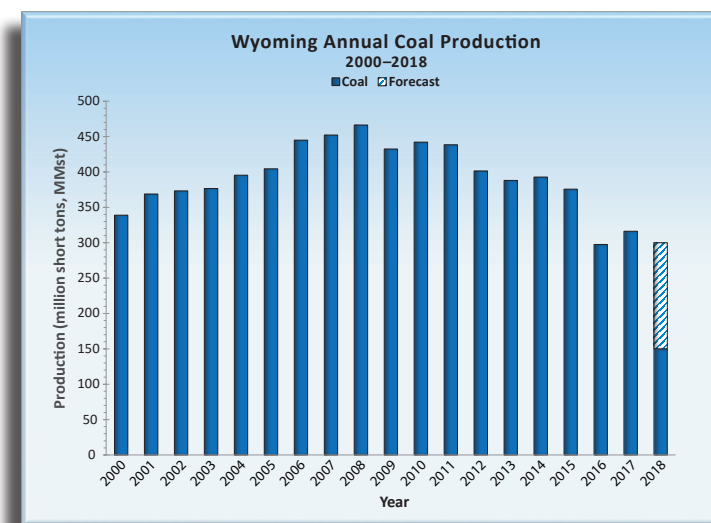


Wyoming coal production consistently accounts for approximately 40% of all U.S. coal produced each year.

### Coal Projects

The WSGS incorporates coal sampling and coal-quality analyses in annual mapping projects. To date, these sampling programs have expanded our knowledge of coal quality throughout the PRB in addition to the eastern Washakie Basin and Atlantic Rim regions. The WSGS is finishing a study estimating the volume of coal resources in the eastern Greater Green River Basin, including the Great Divide and Washakie basins. A report summarizing the results will be released in early 2019.

Maps and data about Wyoming’s coal can be found on the WSGS website: [www.wsgs.wyo.gov/energy/coal](http://www.wsgs.wyo.gov/energy/coal). This includes maps about the state’s coal resources, active coal mining, and coal fields. Coal and coalbed methane datasets are available, as are quarterly coal production figures, National Coal Resource Data System Stratigraphic Data for Wyoming, and information about historic coal mines.



Annual Wyoming coal production, 2000–2018, including actual production from January–June 2018 and projected production for July–December 2018.

**Caption for cover photos:** Left, Pumpjack in front of Almond Formation on the Garden Gulch 1:24,000-scale quadrangle in south-central Wyoming. Right, Steeply dipping coal-bearing Adaville Formation at the Westmoreland Kemmerer mine in Lincoln County, Wyoming.