U.S. Energy Information Administration

Today in Energy

IN-DEPTH ANALYSIS

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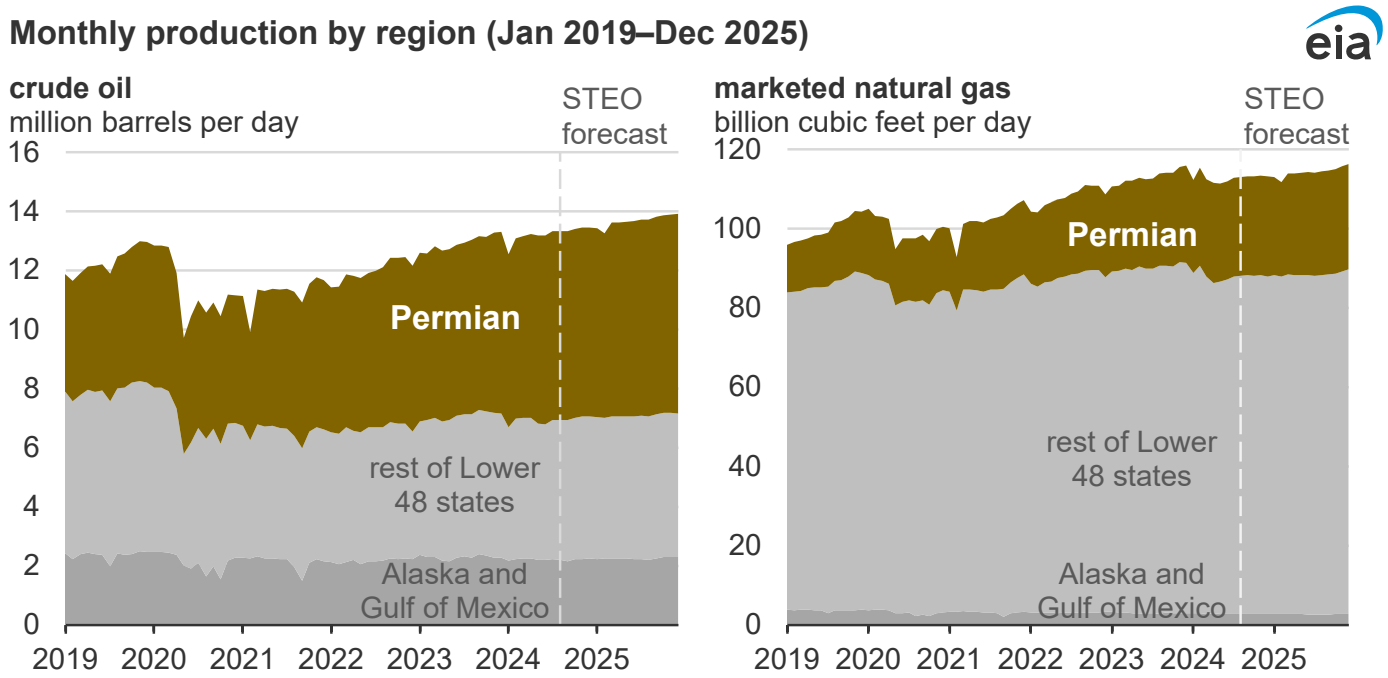
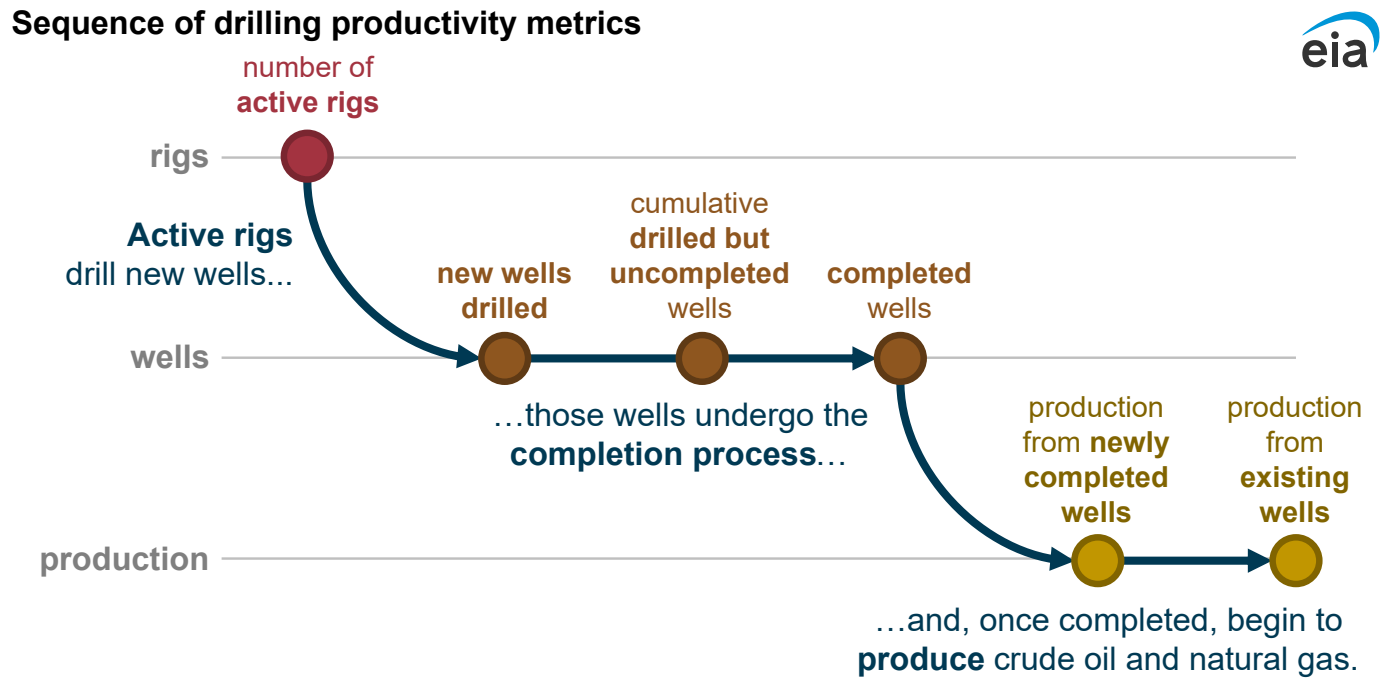
Permian production forecast growth driven by well productivity, pipeline capacity



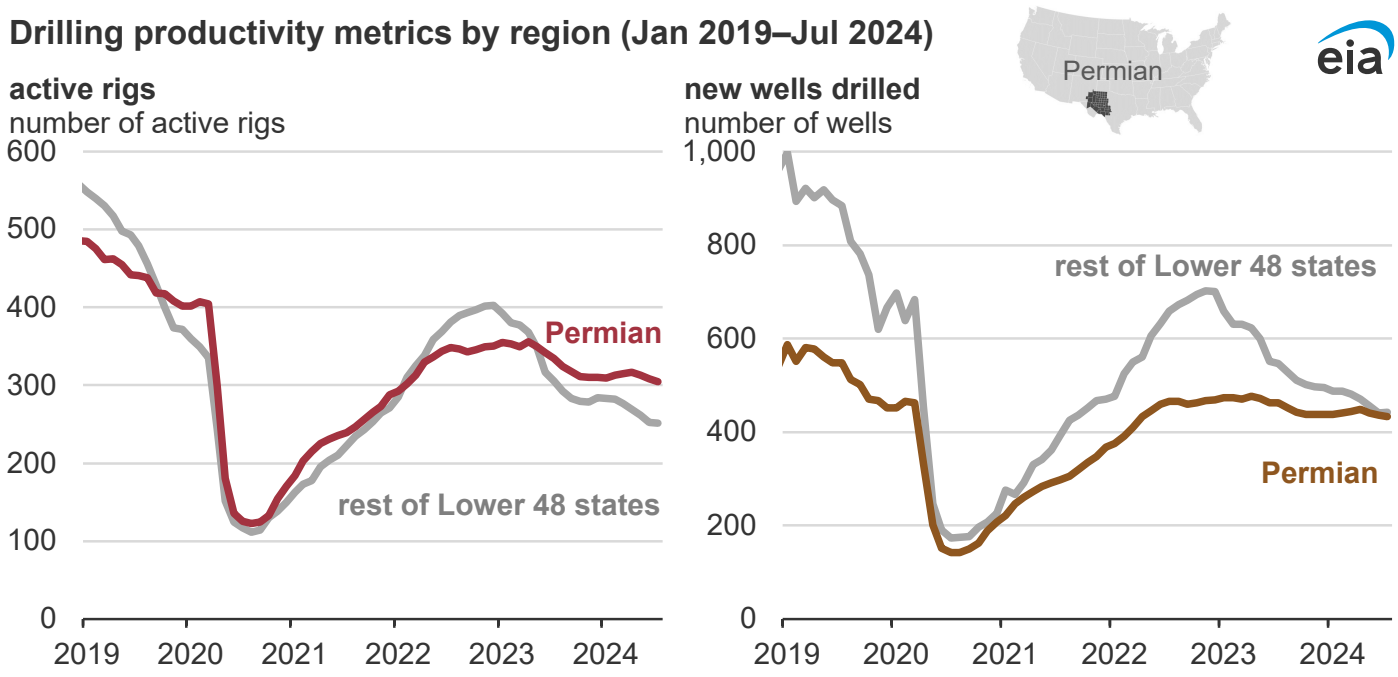
Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook* (STEO), August 2024
Data values: U.S. Petroleum and Other Liquids Supply, Consumption, and Inventories and U.S. Natural Gas Supply, Consumption, and Inventories

In our latest *Short-Term Energy Outlook* (STEO), we forecast that crude oil production in the United States will grow to an average of 13.7 million barrels per day (b/d) and marketed natural gas production will grow to an average of 114.3 billion cubic feet per day (Bcf/d) in 2025. Most of the forecast growth in oil and natural gas production comes from the Permian region of western Texas and eastern New Mexico, where we expect productivity gains, new and expanded infrastructure, and high crude oil prices will support rising production.



Data source: U.S. Energy Information Administration

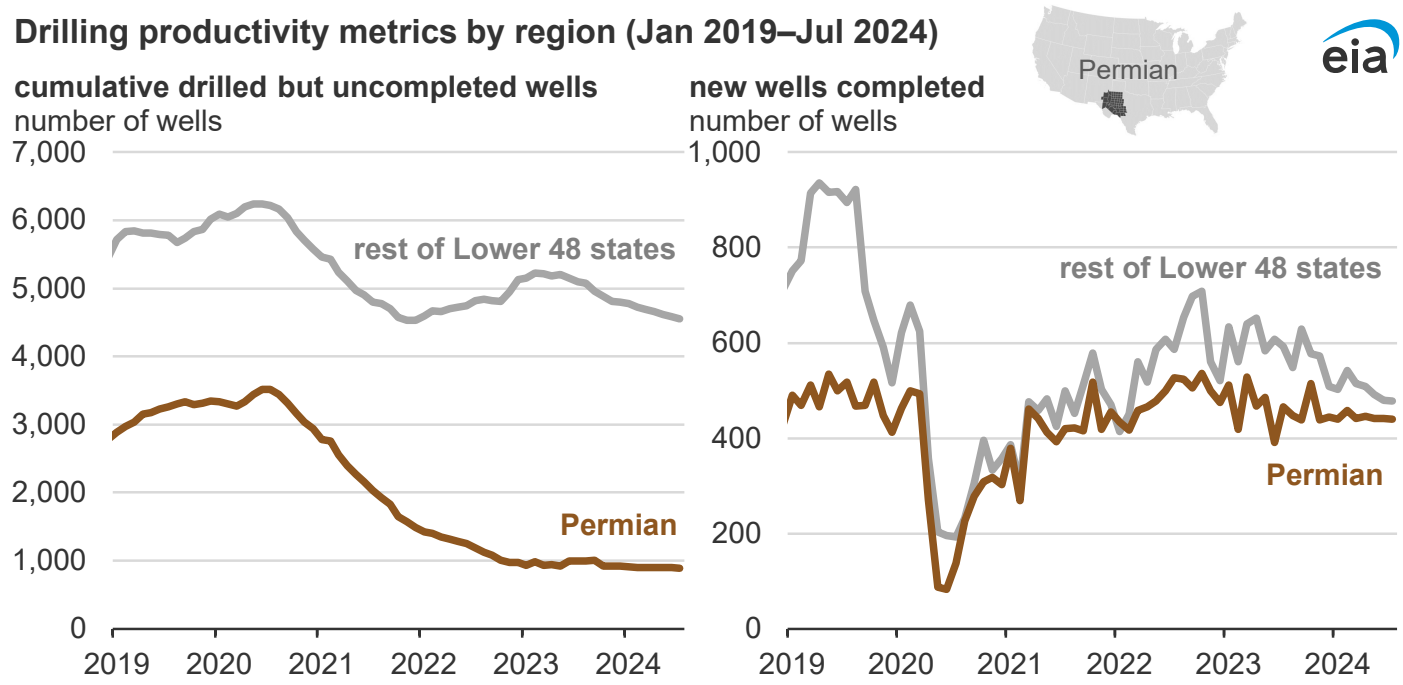
In order to better capture drilling activity in several onshore U.S. regions, our STEO now makes use of multiple drilling productivity metrics. The number of active rigs is the first in a sequence of metrics that affects regional production; currently more rigs are active in the Permian region than in the rest of the Lower 48 states combined. We also capture and report the number of new wells that those rigs have drilled each month.



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, August 2024
Data values: Drilling Productivity Metrics

Drilled but uncompleted wells (DUCs) have been drilled but have not yet undergone well completion activities to start producing hydrocarbons. The well completion process involves casing, cementing, perforating, hydraulic fracturing, and other procedures required to produce crude oil or natural gas. Ultimately, when these wells are completed, they begin producing crude oil, natural gas, or both.

Producers make decisions on drilling and completion operations based on market conditions, prices, and infrastructure. A downward trend in the DUC count means producers are completing more wells than they are drilling.



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, August 2024
Data values: Drilling Productivity Metrics

The metric we use for production from new wells is the first full month of production from each completed well. Aggregate production from new wells depends on both the number of wells completed and those wells' initial production rates.

We also measure how production is changing from existing wells, which we define as wells that have been producing for more than one month. Wells usually produce at their highest rate when they first start producing and pressure in the reservoir is high. As oil and natural gas are produced, the pressure in the reservoir falls, and production from the well declines. We monitor and forecast the monthly difference in aggregate production of existing wells and update our model as more accurate data become available.

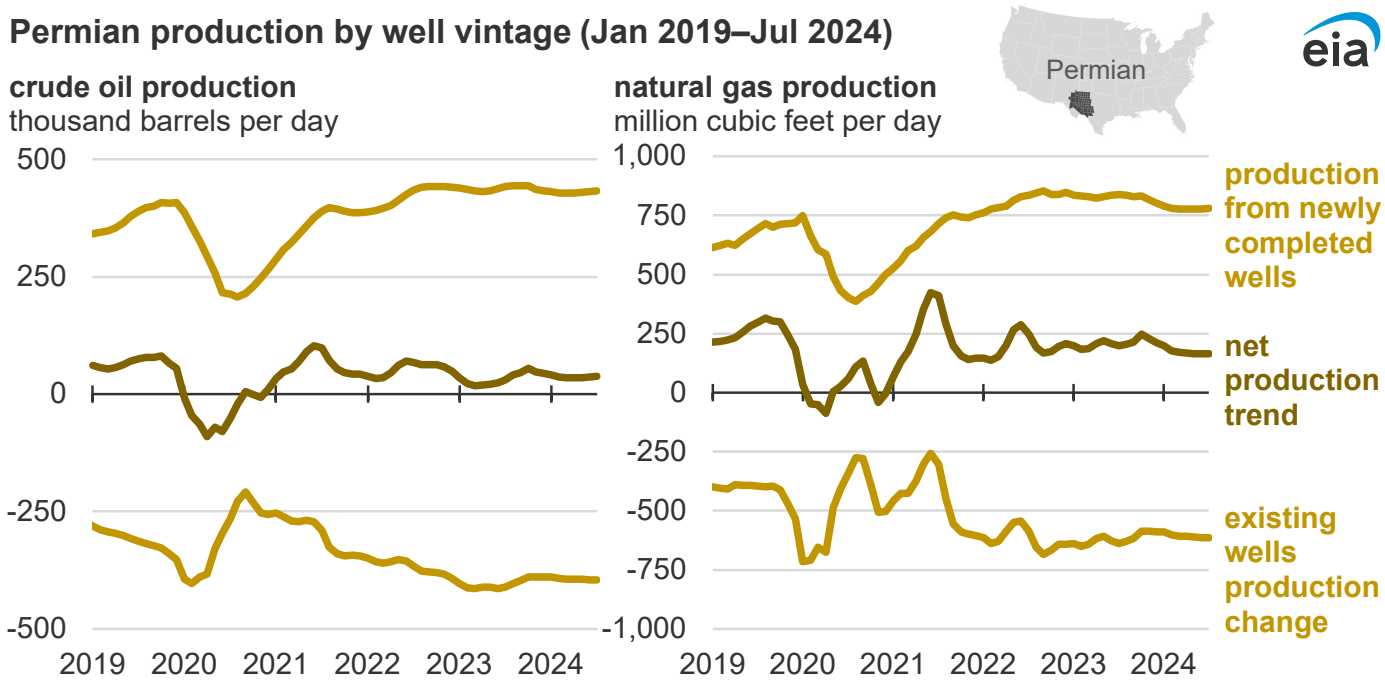
We use these drilling metrics, combined with production trends, to provide insights into how different basins are performing relative to one another based on ratios derived from the reported data series. We base our analysis of productivity and efficiency across various oil- and natural gas-producing regions on the insights we develop comparing these ratios by basin. For example, the decline in the number of DUC wells is less pronounced in the Permian region compared with the rest of the Lower 48 states. This trend suggests that as wells are completed in the Permian (removed from the DUC inventory), new wells are being drilled (added to the DUC inventory) at a faster pace than in other regions.

Well productivity is contributing to Permian production gains

U.S. crude oil and natural gas production has been increasing despite a decline in the number of active rigs since late 2022. Since early 2023, the Permian region has had more active rigs than the rest of the Lower 48 states and has continued to complete hundreds of wells (or prepare them for production) each month.

In the Permian, increased rates of production from new completions are offsetting existing wells' production declines and leading to higher crude oil and natural gas output. These productivity increases indicate significant efficiency gains and technological advancements in the drilling and completion process.

As of July 2024, newly completed wells in the Permian were producing an average of 433,000 b/d in their first full month. Natural gas production from new Permian wells in July 2024 averaged 780 million cubic feet per day. This new well production is more than offsetting the declines in production from existing wells.



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, August 2024
Data values: Drilling Productivity Metrics
Note: The production trends shown above are monthly data smoothed over a 12-month period.

Growing well productivity suggests that operators in the Permian are successfully implementing more advanced drilling and completion techniques, including longer lateral lengths, optimized well spacing, and enhanced fracturing designs.

We forecast that crude oil production in the Permian region will increase by 430,000 b/d from 2023 to 6.3 million b/d in 2024 and 6.6 million b/d in 2025, partly due to drilling productivity improvements.

Similarly, we forecast that marketed natural gas production in the Permian region will rise by 1.9 Bcf/d in 2024 and by 1.0 Bcf/d in 2025 to average 25.8 Bcf/d in 2025. Most of the natural gas production in the Permian is associated natural gas and comes from oil-directed wells. We expect crude oil prices will remain sufficiently high to support growth in crude oil production and associated natural gas production in the region.

New pipeline capacity is delivering Permian production to demand centers

In previous years, rapid growth in crude oil and natural gas production in the Permian region was temporarily constrained by the ability to move that production out of the region. Based on several projects currently under development, we expect that new pipeline capacity will deliver crude oil and natural gas from the Permian region to demand centers and alleviate transportation constraints. Enbridge announced that it is increasing Permian takeaway capacity by expanding its Gray Oak pipeline by 120,000 b/d before the end of 2025.

Similarly, new natural gas pipelines are soon coming online: the 580-mile Matterhorn Express Pipeline, which is expected to enter service in the third quarter of 2024, will be able to transport up to 2.5 Bcf/d of natural gas from the Waha Hub in West Texas to Katy, Texas. The pipeline will receive natural gas from upstream Permian Basin connections and from direct connections at processing facilities in the Midland Basin before connecting to the Agua Blanca Pipeline.

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