

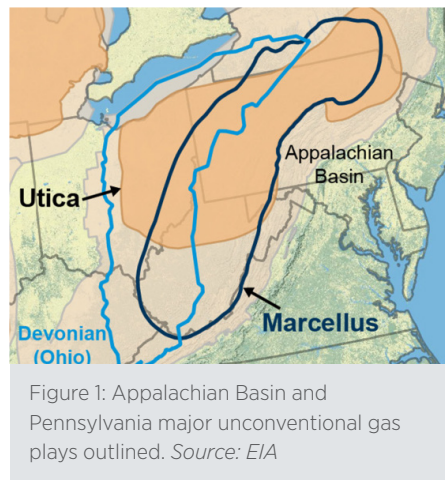


The U.S. Department of Energy's Office of Fossil Energy and Carbon Management (FECM) supports research and development of technologies that can reduce the volume of natural gas (e.g., methane) flared or vented (released) into the atmosphere during crude oil and natural gas production, processing, transportation, and storage operations. Methane is a potent greenhouse gas (GHG) and minimizing its release across the oil and natural gas supply chain is critical to the realization of a net GHG benefit and reducing climate and environmental impacts of carbon-based fuels. This fact sheet was created by FECM to inform stakeholders on state-level production and regulatory activities, as they relate to natural gas flaring and venting. FECM's research portfolio includes efforts to reduce natural gas flaring through the application of improved technologies to capture and utilize small volumes of natural gas at remote locations, as well as technologies to reduce methane release during upstream production operations, as well as midstream natural gas processing and transportation. While flaring activities in the prolific unconventional shale plays have steadily increased between 2011-2019 due to higher oil production levels and natural gas pipeline takeaway capacity constraints, this trend took a sharp downturn since 2020 as a result of significant decline in demand for oil. Other factors include federal and state regulatory efforts to reduce methane emissions, companies taking voluntary actions and measures to minimize flaring of associated natural gas, and additional pipeline projects connecting sources of supply and consumption.

Ohio Producing Plays and Basins

According to the U.S. Energy Information Administration (EIA), Ohio's proved reserves are [279 million barrels of oil](#) and [28.1 trillion cubic feet \(Tcf\)](#) of natural gas (2020). The "[most likely](#)" recoverable shale gas resource for the entire Appalachian Basin is understood to be 858.7 Tcf, with 27.6 Tcf in non-shale gas resources. These resources are contained within the Marcellus Shale, the Utica Shale, and the Devonian (Ohio) Shale.

The Marcellus Shale extends from New York State in the north to southwestern West Virginia, and it is the most productive natural gas play in the Appalachian Basin ([Figure 1](#)).



The [Marcellus](#) currently produces in four states: Pennsylvania, West Virginia, Ohio, and New York. The Marcellus formation ranges in depth from 100–9,900 feet

and primarily produces gas in northeast Pennsylvania but becomes more liquid rich in less thermally mature areas of southwestern Pennsylvania, West Virginia, and southeastern Ohio. According to the [U.S. Geological Survey \(USGS\)](#), the Marcellus Shale play contains about 84 Tcf of natural gas and 3.4 billion barrels of liquids (both undiscovered, technically recoverable). However, the Institute for Energy Research [estimated](#) that the play could hold as much as 500 Tcf of recoverable natural gas.

The [Utica Shale](#) is a stacked play underlying the Marcellus Shale that includes both the Utica formation and the underlying Point Pleasant formation. The most productive areas of the Point Pleasant formation are located in eastern

Ohio [Oil](#) and [Natural Gas](#) Statistics (EIA)

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|-------|-------|-------|-------|-------|-------|
| Crude Oil Production (Average Thousand Barrels/Day) | 73 | 59 | 55 | 62 | 77 | 65 | 50 |
| Natural Gas Gross Withdrawals and Production (Average MMcf/Day) | 2,756 | 3,926 | 4,908 | 6,584 | 7,265 | 6,500 | 6,210 |
| Natural Gas Gross Withdrawals and Production (Vented and Flared) (MMcf/Day) | Ohio does not maintain a database of total annual gas vented or flared. | | | | | | |
| Natural Gas Gross Withdrawals and Production (Oil Wells) (MMcf/Day) | 108.1 | 11.5 | 11 | 12.1 | 14.5 | 13.2 | N/A |
| Natural Gas and Gas Producing Oil Wells (Thousands) | 37.6 | 38.6 | 36.7 | 42.2 | 41.7 | 37.7 | N/A |

MMcf – million cubic feet

2021 ranking among 32 U.S. oil and natural gas producing states — [Oil](#): 14 [Natural Gas](#): 8

Ohio and western Pennsylvania. The Utica Shale extends over 115,000 square miles and the Point Pleasant slightly less, of which about 75 percent is prospective. The [Utica play](#) could hold technically recoverable volumes of 782 Tcf of natural gas and nearly 2 billion barrels of oil. [EIA estimates](#) proved reserves of 6.4 Tcf for the Utica play (2017).

The Devonian (Ohio) Shale is a shallower formation that extends across the Appalachian Basin, including parts of eastern Ohio, West Virginia, Kentucky, and Pennsylvania. This low-pressure shale formation has produced gas since the late 1800s, and large numbers of marginal gas wells continue to produce at low rates. Western Pennsylvania, western Ohio, and northern West Virginia also produce limited amounts of crude oil from shallow formations.

Ohio Key Regulations Associated with Flaring and Venting

The [Division of Oil and Gas Resources](#) at the Ohio Department of Natural Resources is charged with enforcing the rules related to natural gas flaring and venting in the state. The original regulation, recorded as [Ohio Revised Code Title 15, Conservation of Natural Resources, Chapter 1509.20, Prevention of Waste – Gas Flaring](#), was published in 1965 and amended in 2010. This rule requires that well owners and operators prevent wasting oil and gas and allows for flaring gas “when it is necessary to protect the health and safety

of the public or when the gas is lawfully produced and there is no economic market at the well for escaping gas.”

Additional relevant rules are included as part of the Ohio Administrative Code within [Chapter 1501:9-9](#), Division of Mineral Resources Management – Oil and Gas; Safety Regulations. Chapter 1501:9-9-05, *Producing Operations*, Section B mandates that “All gas vented to the atmosphere must be flared, with the exception of gas released by a properly functioning relief device and gas released by controlled venting for testing, blowing down and cleaning out wells.” This section also outlines that flares must be 100 feet from the well, all surface equipment, and inhabited structures. Additionally, [Chapter 15.1:9-9-03, Drilling and Deepening Operations](#), Section K requires that local emergency response officials be notified when flaring is expected to occur in urban areas.

In addition, the Ohio Environmental Protection Agency (EPA) is tasked with administering air quality permitting programs in Ohio. All oil and gas production facilities are required to obtain an air permit before beginning construction. After application, the approval process can take between 45–180 days. Facilities need to consider the flare size in order to apply for the appropriate permit. Flares expected to burn less than 10 million British thermal units (MMBtu)/hour should use the [General Permit \(GP\) 12.1](#) air permit, while the [GP 12.2](#) should be used if the flare is expected to

burn between 10 and 32 MMBtu/hour. According to the Ohio EPA, once facilities are permitted on a volume range, the actual volumes are not collected and aggregated.

Ohio State Points of Contact

Ohio Department of Natural Resources: Division of Oil and Gas Resources

Contact the Division of Oil and Gas Resources for information on oil and gas drilling operations, production, and restoration.

Website: <http://oilandgas.ohiodnr.gov/>

Email: Adam.Schroeder@dnr.ohio.gov

Phone: 614-265-6937

Ohio Environmental Protection Agency: Division of Air Pollution Control

Contact the Division of Air Pollution Control for information on permits for gas flaring.

Website: <https://epa.ohio.gov/dapc/>

Email: Michael.Hopkins@epa.ohio.gov

Phone: 614-644-3611

Visit <https://www.energy.gov/fecm/findyourstate-natural-gas-flaring-and-venting-regulations-fact-sheets-state> for a digital version of this fact sheet that includes hyperlinks to information sources.



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Information current as of June 2022.