



The U.S. Department of Energy's Office of Fossil Energy (FE) 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 exploration, production, processing, transportation, and storage operations. This fact sheet was created by FE to inform stakeholders on state-level production and regulatory activity regarding natural gas flaring and venting. FE's research portfolio includes efforts to reduce methane (and other hydrocarbon) 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 (primarily) methane release during midstream gas processing and transportation. Intermittent flaring that occurs as a result of routine well testing, production facility process shutdowns, or facility and pipeline infrastructure maintenance, are normal aspects of safe oil and natural gas production. Increases in domestic oil and natural gas production have resulted in significant infrastructure buildouts, however, natural gas pipeline capacity constraints have led to regional increases in the flaring of associated gas in some unconventional plays (e.g., Permian Basin in Texas and New Mexico and Bakken Shale in North Dakota) in order to enable oil production.

Michigan Producing Plays and Basins

The U.S. Energy Information Administration (EIA) estimates Michigan's proved reserves to be at [59 million barrels of oil](#) and [1.5 trillion cubic feet \(Tcf\)](#) of natural gas. The Michigan Basin encompasses the entire Lower Peninsula of Michigan ([Figure 1](#)). While there is oil and natural gas production in the Lower Peninsula, none occurs in the Upper Peninsula. Based upon data from the [Michigan Public Service Commission](#), the Antrim play is currently the most active gas play in Michigan with about 9,100 wells producing relatively low amounts of gas—approximately 25 Tcf per day per well. Still, the Antrim Shale is responsible for more than 80 percent of Michigan's



Figure 1: Michigan's producing basin with the Antrim shale gas play outlined.
Source: EIA

natural gas production. Michigan has limited crude oil production from stripper wells scattered across the Lower Peninsula. Oil production peaked in 1979 at 35 million barrels per year and has since

declined to only about a seventh of that total, as illustrated by [EIA data](#). At the end of their producing lives, some Michigan reservoirs converted into gas storage fields, which now play an important part in meeting the state's high winter demands for natural gas.

Michigan Key Regulations Associated with Flaring and Venting

The [Oil, Gas, and Minerals Division](#) of the Michigan Department of Environmental Quality is responsible for administering the oil and gas rules outlined in the [Natural Resources and Environmental Protection Act, 1994, Public Act 451 Part 615, Supervisor of Wells](#) (beginning on page 1038). Michigan allows flaring

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

	2013	2014	2015	2016	2017	2018
Crude Oil Production (Average Thousand Barrels/Day)	19	20	18	16	15	N/A
Natural Gas Gross Withdrawals and Production (Average MMcf/Day)	339	315	295	279	266	N/A
Natural Gas Gross Withdrawals and Production (Vented and Flared) (Mcf/Day) *	312	304	309	364	471	N/A
Natural Gas Gross Withdrawals and Production (Oil Wells) (Mcf/Day)	13	15	13	12	12	N/A
Natural Gas and Gas Producing Oil Wells (Thousands)	10.8	10.8	10.6	10.4	10.1	N/A

MMcf - million cubic feet
Mcf - thousand cubic feet

*Data provided by the Michigan Department of Environmental Quality

2017 ranking among 32 U.S. oil and natural gas producing states — [Oil](#): 19 [Natural Gas](#): 18

of natural gas under certain conditions, as defined in flaring and venting related sections of Part 615: R 324-506, R 324-610, R 324-1002(m), R 324-1010, R 324-116, R 324-1122, and R 324-1123. The state maintains records of flaring volumes for certain wells that must submit flared volumes by either rule or order, or both. This data is not available in online databases, but the state is responsive to data requests via email.

Permissible volumes vary based upon geographic location in the state of Michigan. For wells producing from the Trenton Black River Formation and flare, restrictions limit flaring to 100 thousand cubic feet (Mcf)/day or less, and operators must report them according to [Supervisor of Wells Order No. 18-2007](#). For those wells that produce from the Trenton Black River Formation and flare gas versus market the gas, the flaring volumes reside in paper copy format or in other formats not currently uploaded into the state's online database. For wells producing from the Salina-Niagaran Formation, [Supervisor of Wells Order No. 3-71](#) (commonly known as the No-Flare Order) does not allow any flaring unless an exception is granted. The order restricts flaring by procedure to 40 Mcf/day or less. It does not require operators to report the actual flared volumes for these wells. For wells that produce from formations other than the Salina-Niagaran or Trenton Black River, there are restrictions on the volume of flaring on those wells that may flare natural gas (casing head gas) under the general rule of "waste," which considers excessive flared volumes to be waste.

Further restrictions to flaring in the state of Michigan include:

- For an oil or gas well (or both) that contains 300 ppm or more of hydrogen sulfide and that reaches drilling completion after March 1, 1987, a permittee shall not locate surface facilities and associated flare stacks

within a residential area that has been zoned before January 8, 1993. A permittee may only locate the facilities within such an area if the permittee satisfies specific provisions of this rule or obtains a variance. The supervisor may grant an exception to permit flaring in a residentially zoned area for testing the production characteristics of a well for a period of not more than 15 days, unless a longer period is authorized by the supervisor (per [Public Act 451](#), Part 615, Section R 324.506, Rule 506).

- Wellheads, flare pits, vents, and flare stacks shall have secondary containment and spill containment areas constructed in a manner to prevent the seepage of hydrocarbons or brine, or both, into the surrounding soils, surface waters, or groundwater (Per Public Act 451, Part 615, Section R 324.1002, part (m)).
- Permittees of a well shall ensure that they burn, process, or dispose all gas produced in the operation or testing of wells that they do not utilize. They should perform such actions in a manner consistent with these rules and all applicable state and federal laws and regulations. Permittees shall not burn the gas closer than 100 feet from a well or storage tank or 300 feet from structures used for a public or private occupancy or from any other flammable and combustible material (per R 324.1010).
- If a gas kick occurs, permittees shall circulate all returning drilling through a mud gas separator. They shall route all gas separated from the drilling fluid by the mud gas separator to a properly engineered incinerator or flare that has an elevated discharge to the atmosphere and burn it (per R 324.1116).
- Well permit holders must ensure that an incinerator or flare installed is designed and equipped to prevent the release of unburned gas to the atmosphere. If

the daily volume of gas handled by the incinerator or flare contains 28 pounds or more of hydrogen sulfide, then a permittee shall ensure that the incinerator or flare has a mechanism that operates upon failure of the pilot light to shut off the flow of fluid from the wellhead (per R 324.1123).

- Restrictions to the venting of hydrogen sulfide bearing gas is 5 Mcf/day or less (per R 324.1122).

Michigan State Points of Contact

Michigan Department of Environmental Quality; Air Quality Division

Contact the Air Quality Division at the Michigan Department of Environmental Quality for information regarding air quality regulations and permit requirements.

Website: <https://www.michigan.gov/deq/0,4561,7-135-3310---,00.html>

Email: infoaers@michigan.gov

Phone: 517-284-6739

Michigan Department of Environmental Quality; Oil, Gas, and Minerals Division

Contact the Oil, Gas, and Minerals Division at the Michigan Department of Environmental Quality for additional information on oil and gas regulations, flaring and venting rules, and permit applications:

Website: https://www.michigan.gov/deq/0,4561,7-135-3311_4231---,00.html

Email: pettitj@michigan.gov

Phone: 517-284-6837

Visit energy.gov/fe/state-natural-gas-flaring-and-venting-regulations for a digital version of this fact sheet that includes hyperlinks to information sources.