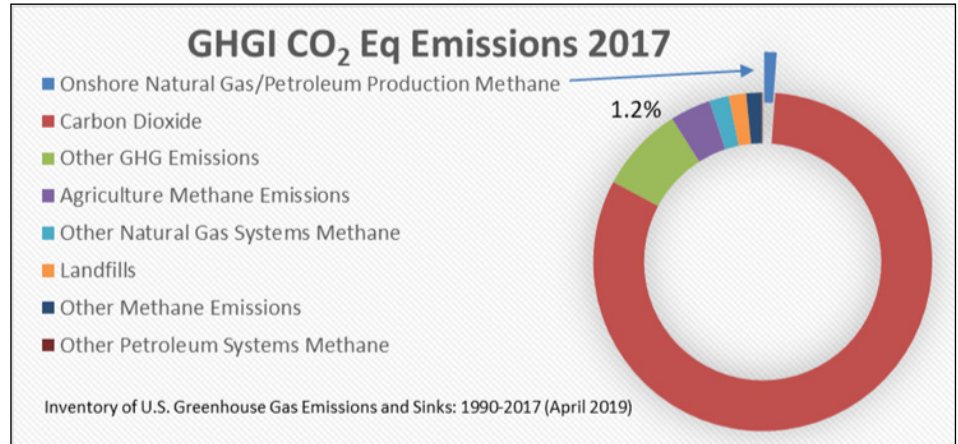


NATURAL GAS & OIL PRODUCTION METHANE EMISSIONS MANAGEMENT

How significant are natural gas and oil production methane emissions?

The most comprehensive accounting of greenhouse gas related emissions is the annual Inventory of U.S. Greenhouse Gas (GHG) Emissions and Sinks (GHGI) compiled by the Environmental Protection Agency. This Inventory calculates emissions based on both reported emissions and estimates of emissions from smaller sources. The Inventory presents these results using the international standard as carbon dioxide equivalents – converting all greenhouse gases to this 100 year time horizon basis.



Using the latest 2019 Inventory that reports emissions through 2017, natural gas and oil production methane emissions are approximately 1.2 percent of the inventory.

Are natural gas and oil production methane emissions controlled?

Both federal and state regulations apply to production emissions. The federal New Source Performance Standards (NSPS) affect all new facilities whether on private, federal or tribal land. The first of these (Subpart OOOO) in 2012 addressed the largest emissions sources – storage tanks, pneumatic controllers, natural gas well completions. The second (Subpart OOOOa) affects smaller emissions sources – oil well completions, pneumatic pumps – and includes a controversial fugitive emissions requirement.

In reality, though, States are the primary regulators of natural gas and oil production emissions. Their regulations govern both new and existing facilities. And, over the past decade as unconventional gas and oil redefined the nature of American production, these states have actively restructured their requirements.

Doesn't increased American natural gas and oil production mean substantial methane increases?

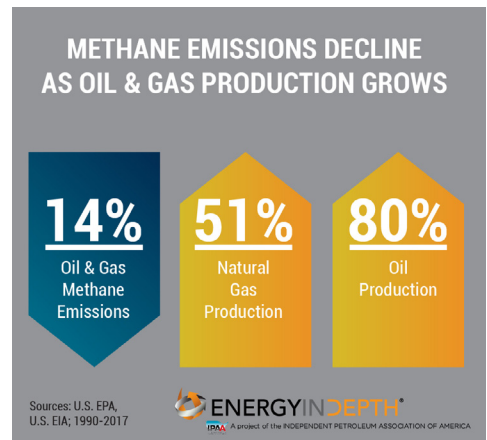
From 1990 through 2017, American natural gas production has increased 51% and oil production has increased 80% while natural gas and oil production methane emissions have declined 14%. This

TO THE POINT

- ▶ Natural Gas and Oil production methane emissions are 1.2 percent of the 2017 GHGI.
- ▶ Federal and state regulations manage natural gas and oil production methane emissions; states are the primary regulators.
- ▶ Methane emissions have decreased while natural gas and oil production has increased substantially.
- ▶ Federal regulations in 2016 targeted existing sources of production threatening small business low production wells without creating environmental benefits.
- ▶ Natural gas production provides substantial reductions in American GHG emissions, more benefits than wind and solar combined.

information reflects the nature of the industry. Unlike manufacturing operations that operate at their design rates, natural gas and oil production is characterized by the reality that their production declines over time. Consequently, new wells are constantly replacing old ones and as new emissions controls are applied, emissions will continue to be controlled.

For example, the unconventional production revolution began in the mid-2000s and even before the 2012 NSPS, companies were voluntarily implementing controls that reduced their emissions of volatile organic compounds (VOC) and methane. By the end of 2018, the Energy Information Administration (EIA) reported that 70% of American natural gas production and 60% of American crude oil production comes from these unconventional resources.



Why does industry oppose the June 2016 EPA methane regulations?

It is essential to understand that industry does not oppose all of the elements of the regulations promulgated in June 2016. Its issues relate to elements that are not cost effective. And, those issues are partly related to the nature of the Clean Air Act (CAA).

The 2012 oil and natural gas production regulation targeted the predominant production emissions using a VOC basis. Importantly, for natural gas and oil production facilities, VOC regulations also capture methane emissions. While there are always some issues with interpretation of requirements, the 2012 regulations were largely based on known technology.

However, following those requirements, the June 2016 regulations shifted to target methane as the regulated emissions. These requirements present significant problems because they rely on questionable technologies – principally with regard to fugitive emissions.

Here the issues are multiple. First, the regulations use a costly, cumbersome and questionable Optical Gas Imaging (OGI) Leak Detection and Repair (LDAR) technology. Second, because of the structure of the CAA, as a methane regulation, the requirements expand from new sources to existing sources. Instead of a regulation that affects 25,000 to 45,000 facilities per year, it expands to one million sources of which 770,000 are low production, small business operations. Third, these federal requirements could create double regulations since they differ from state requirements.

While the cost effectiveness of these LDAR requirements are questionable for the large new wells that are developed, they are clearly a different challenge when applied to low production wells. According to EIA the average new natural gas well produces 4,000 mcf/d and the average new oil well produces 700 barrels/day. These are vastly different from low production wells – wells that produce less than 15 barrels of oil per day or 90 mcf of gas per day. These wells average about 24 mcf/d for natural gas wells and 2.5 barrels/day for oil wells. Moreover, even those new large wells will eventually decline to low production wells and the LDAR requirements will pose an overbearing burden on their operations.

Given that the emissions from these small wells are low and over time the 2012 requirements will be embedded in their operations, industry opposes the 2016 regulations because they threaten all of these low production wells with costly requirements that do not create additional environmental benefits.

Additionally, the use of methane as the targeted emission instead of VOC that triggers the nationwide regulation of existing facilities (Section 111(d)) raises significant questions about interpretation of the CAA. This section was designed to address a small number of chemicals that are produced by a small number of facilities. Applying it to a million facilities is a highly questionable decision driven by a policy agenda not environmental benefits.

Why does industry oppose the November 2016 BLM Venting and Flaring regulation?

Similar to the EPA rules, the Bureau of Land Management (BLM) rule raises significant questions about interpretation of the Mineral Leasing Act (MLA) that is used as the basis for these regulations. The BLM was not granted the authority to regulate emissions under the MLA because that federal authority resides with EPA.

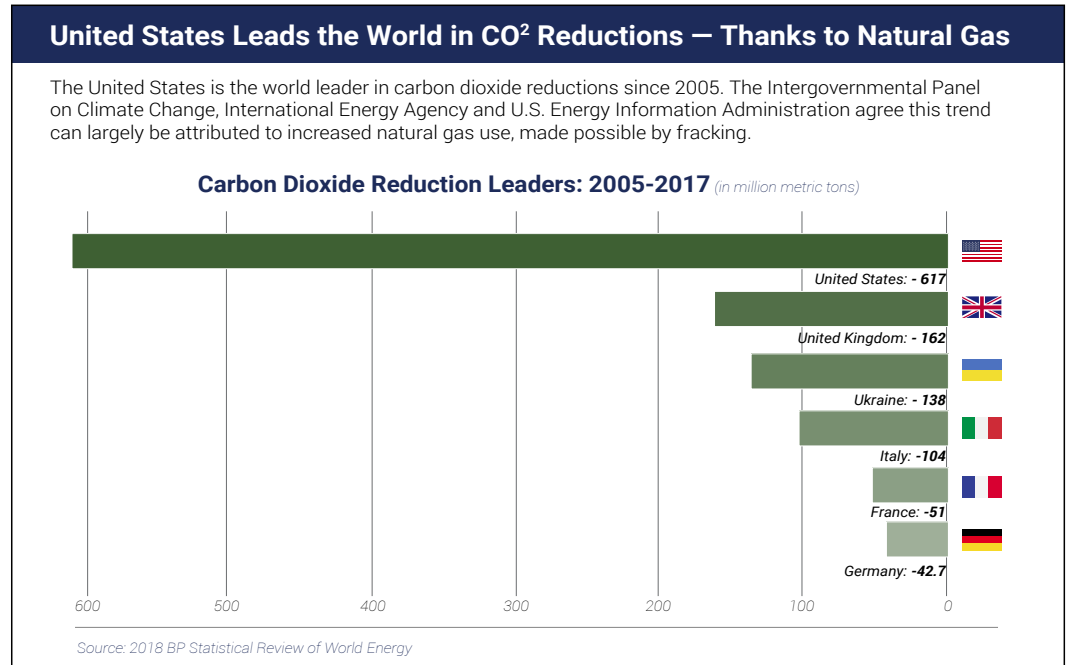
Importantly, since all new facilities must meet the EPA NSPS requirements, the BLM requirements more significant impacts result from the expansion of controls to existing sources. These requirements will ultimately cause low production wells to be shut in. There are over 69,000 low production wells on federal lands,

Finally, a one-size-fits-all approach to methane regulation is inefficient for federal lands states particularly since nearly all production on federal lands occurs in states that have recently updated their state regulations for methane.

To be clear, the Trump Administration did not dispose of the BLM regulation altogether but altered it to be more compatible with the duties of the BLM as defined in the Mineral Leasing Act.

Why should we continue to produce natural gas?

Keep It In the Ground activists are intensely targeting the minor methane emissions from natural gas production. They fail to understand it is a key part to any GHG emissions response strategy. The United States has reduced its GHG emissions more than any other country in the world from 2005 through 2017 primarily because of the use of natural gas. Natural gas has reduced GHG emissions by 50 percent more than wind and solar combined.

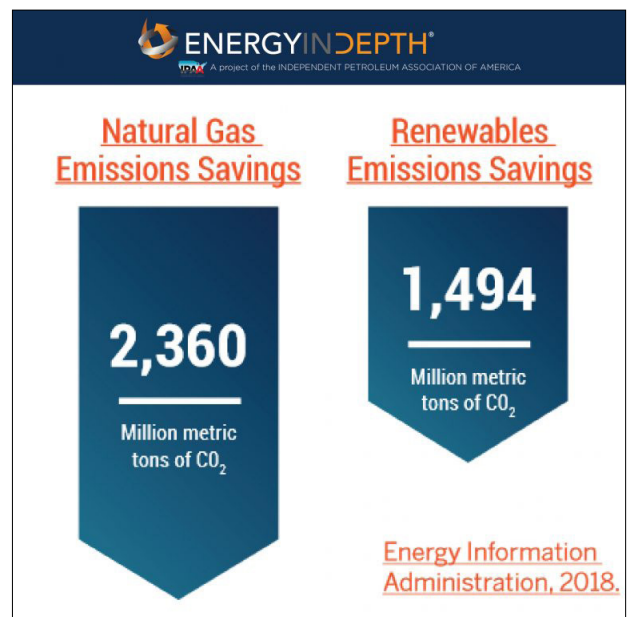


Equally important, exported natural gas helps other countries address GHG emissions. The United States has now become a net exporter of natural gas and export capacity will continue to grow.

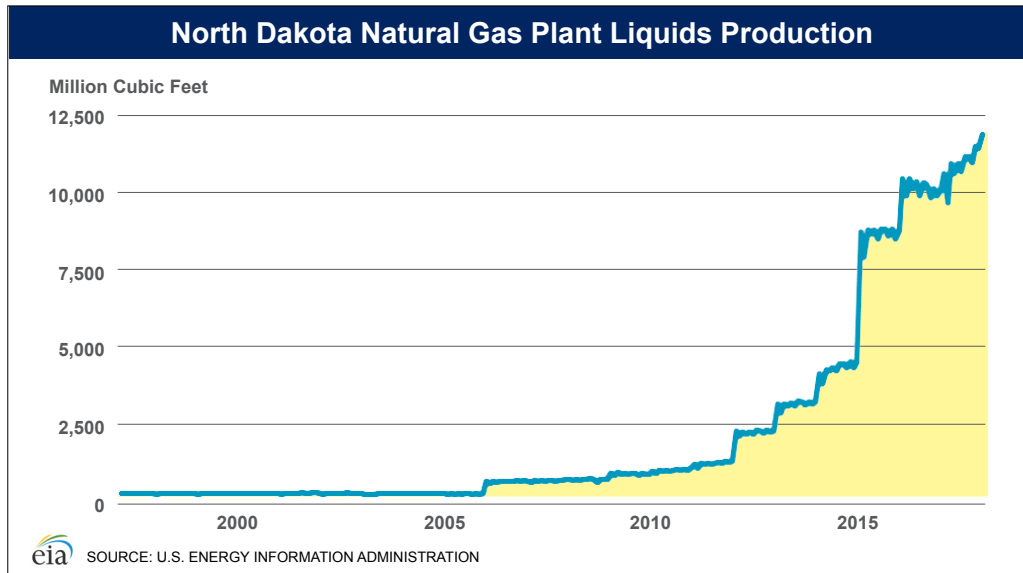
Why does industry flare gas?

Flared gas draws press attention and frequent comments from Keep It In the Ground activists. Importantly, flared gas produces carbon dioxide emissions; it is not vented methane. Flared gas results from burning the associated gas component of oil production; associated gas is a naturally occurring part of the crude oil mixture. Unfortunately, excessive flaring primarily results from the development of crude oil where natural gas processing and pipeline takeaway capacity cannot handle all of the associated gas. Since takeaway capacity is not sufficient and the gas cannot be emitted as methane, it must be flared.

Gas processing facilities and pipelines are being designed, permitted and built, but it takes time. The most frequently discussed flaring situations are in the Permian Basin of Texas and New Mexico and the Bakken area of North Dakota. Currently, these areas are collectively flaring associated gases equal to slightly more than *one percent* of U.S. natural gas production. In both states, substantial additional investments are being planned and made to process and transport these flared gases. In Texas, new pipeline projects are under development to transport over 4 billion cubic feet per day of gases with half of that capacity



coming on line in late 2019 and the other half by late 2020. The volumes of the projects exceed the current volumes being flared. In North Dakota, substantial investment has been made over the past decade to capture and process associated gases and liquids that would otherwise be flared but additional projects are needed. And those investments are being planned. For example, one company will be increasing capacity at its existing processing facility by 60 percent by 2021. Independent producers are well aware of the need capture economically recoverable associated gases, but the reality of building facilities – essentially mini-refineries – to process the gases and natural gas liquids is both time and capital intensive.



Meanwhile, while the Keep It In the Ground groups criticize gas flaring, they are aggressively challenging whenever possible the pipeline construction permits needed to move both these associated gases and the rest of American natural gas production. These efforts are characterized by actions to stop the Federal Energy Regulatory Commission (FERC) from granting permits for new or expanded natural gas pipelines to challenging FERC and other federal and state permits to pressuring states to deny permits under delegated federal law for pipelines.

For questions or more information, please contact the IPAA Government Relations team at 202.857.4722.