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Emissions of Methane, a Potent Greenhouse Gas, May Be Underestimated

Leaks from natural gas extraction may be a bigger source of U.S. methane emissions than previously thought, a new study finds

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smithsonian.com
November 25, 2013



The production of oil and gas produces methane. But official counts may be underestimating just how much of this potent greenhouse gas comes from natural gas and similar sources.

Photo by Flickr user [Kara Newhouse](#)

Official estimates of U.S. emissions of the greenhouse gas methane may be far too low, according to a [report](#) published today by the *Proceedings of the National Academy of Sciences*. Oil and gas production is contributing much more methane than either the U.S. Environmental Protection Agency (EPA) or the best global survey of the greenhouse gas assume.

Carbon dioxide tends to get the most attention in climate change discussions because it's the greenhouse gas most responsible for the changes we're now seeing on Earth. But [methane](#) (CH₄) has similar heat-trapping effects, and pound for pound, it traps 70 times more heat than carbon dioxide (CO₂). However, methane has a shorter atmospheric lifespan, sticking around only for about ten years, compared to a century for CO₂.

Like carbon dioxide, methane has been on the rise. Atmospheric concentrations of CH₄ have increased from around 680 to 715 parts per billion (ppb) before the Industrial Revolution to approximately 1,800 ppb today. Determining where all that extra methane is coming from is important for efforts to reduce greenhouse gas emissions and limit future climate change effects.

The EPA currently lists livestock production as the biggest methane contributor, followed by, in order, natural gas production, landfills and coal mining. Methane measurements made from [aircraft](#), however, are calling that order, and the EPA's methane estimates, into question. The EPA and the [Emissions Database for Global Atmospheric Research](#) (EDGAR) both use a "bottom up" method of estimating methane, which depends on taking samples and calculating how much methane comes from known emitters, such as livestock herds and petroleum fields, then adding it all up. The aircraft studies take a "top-down" approach instead, starting with measurements of methane in atmospheric samples.

In the new study, [Scot M. Miller](#) of Harvard University and colleagues used aircraft-based sampling and a National Oceanic and Atmospheric Administration/Department of Energy air-sampling network to tally 12,694 observations of methane from across the United States in 2007 and 2008. They then used those observations and a computer model to create estimates of monthly methane emissions. The analysis found large differences between their observations and the EPA and EDGAR estimates: The new figures were 1.5 times greater than those of the EPA and 1.7 times those from EDGAR.

Nearly a quarter of the nation's methane emissions came from just three states—Texas, Oklahoma and Kansas. The estimates for CH₄ emissions from these three states were 2.7 times higher than those of EDGAR. "Texas and Oklahoma were among the top five natural gas producing states in the country in 2007," the researchers note in their paper. The team was able to trace the methane to oil and gas production not simply through coincidences of geography but also because of their observations found [propane](#) in the atmosphere above certain areas in these states. Propane is not produced by methane sources such as livestock or landfills—rather, it is released during fossil fuel extraction. Thus, its presence indicates that some fraction of the methane over those those regions must come from fossil fuels.

"This is the first study to quantify methane emissions at regional scales within the continental United States with enough spatial resolution to significantly criticize the official inventories," study co-author Marc L. Fischer, of the University of California Berkeley, said in a [statement](#). "Even if we made emissions from livestock several times higher than inventory estimates would suggest for the

southwest, you still don't get enough to cover what's actually being observed. That's why it looks like oil and gas are likely responsible for a large part of the remainder...Cows don't produce propane; oil and gas does."

Cow farts aren't getting off the hook here, and clearly the oil and gas industry is already known to be a big contributor to climate change. But one of the selling points of natural gas has been that it is more climate-friendly—or at least less climate-damaging—than other forms of fossil fuels, such as coal. If producing that natural gas results in more methane emissions than currently assumed, then it **might not be** such a good choice after all.

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