

Barnett shale research raises new concerns about methane emissions

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Researchers from the University of Houston found that some natural gas wells, compressor stations and processing plants in the Barnett Shale leak far more methane (CH₄) than previously estimated, potentially offsetting the climate benefits of natural gas.

The study is one of 11 papers published in the July 7 edition of *Environmental Science & Technology*, all looking at fugitive methane emissions in the Barnett Shale. That region, site of the first widespread shale development in the United States, includes Dallas-Fort Worth and almost two dozen counties to the west and south.

The studies were coordinated by the Environmental Defense Fund, with funding from the Alfred P. Sloane Foundation. All field measurements were conducted over 15 days in October 2013.

Natural gas burns more cleanly than other fossil fuels, producing more energy per carbon dioxide molecule than oil or coal. But Robert Talbot, professor of atmospheric chemistry at UH, noted that CH₄, the primary component of natural gas, is a potent greenhouse gas. The paper notes that methane has a global warming potential over a 100-year time frame as high as 34 times that of carbon dioxide.

Talbot authored the paper, along with Xin Lan and Azucena Torres, who were graduate students in his UH lab at the time, and former post-doctoral research associate Patrick Laine.

"In the past decade, the horizontal-drilling and hydraulic-fracturing techniques have led to a boom in natural gas production," they write. "However, CH₄ emissions associated with the production and transmission of natural gas have raised concern from several parties."

There are natural sources of methane, including wetlands and landfills. The UH researchers measured emissions from a dozen landfills, as well as testing from public roads next to natural gas well pads, compressor stations and processing plants. All testing was done with a mobile laboratory.

The emissions were measured and reported in several ways; the researchers also calculated measurements to gauge what percentage of the natural gas produced escaped through emissions.

A few individual sites had very high methane loss rates that would make [natural gas](#) from these sites worse for the climate than coal in the short term. That finding drives interest in determining the prevalence of high-emission sites.

Releases at specific installations ranged from 0.01 percent to 47.8 percent; the median was 2.1 percent.

Methane releases from compressor stations and processing plants were considerably higher than that at the well pads, the researchers reported.

Some emissions can be attributed to human error, compounded by the fact that the sites are often left unattended for long periods of time, Talbot said. "A lot of them are a broken valve, or someone leaves a hatch open. It's human error. And nobody goes back to the site for a month or so."

In all, researchers tested 152 facilities, driving 3,700 kilometers - about

2,300 miles - during the 15-day test period. They tested 125 well pads, 13 compressor stations, two gas processing plants and 12 landfills.

The results from this study were used in two other Barnett Campaign papers to determine the contribution of high emission sites to regional [methane](#) emissions.

Provided by University of Houston

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