

A failed Aliso Canyon gas storage well released more than 200 million pounds of methane before the leak was plugged.

Natural Gas and Global Warming

California's Clean Energy Progress Undercut by Methane Leaks

California has made great strides to combat global warming with clean energy and electric cars, but recent research shows that methane leaks during the production of oil and natural gas in California, as well as during the transportation and storage of natural gas, can erode or nullify our climate leadership.



Methane Leaks from Fracking

In 2014, at least 650 wells were fracked in California, releasing an estimated total of 140 million pounds of methane within their first few weeks of operation. 140 million pounds:

- Is equal to two thirds the amount of methane released at the failed Aliso Canyon gas storage well.
- Has a greater impact on the climate than the emissions avoided from all residential rooftop solar panels in California.
- Has a greater impact on the climate than the emissions avoided from all electric vehicles in California.

Definitive data on fracking and methane leaks in California are limited, but a review of multiple national studies finds evidence of high methane leakage rates from all stages of fracking, including production, transportation and storage. These methane leaks can be significant enough to erode or nullify any climate benefits of natural gas.

Natural Gas a "Bridge Fuel?"

Natural gas has been promoted as a "bridge fuel" that can help reduce global warming pollution by replacing coal-fired electricity generation and buying time to develop more wind, solar and other clean energy sources. This argument rests on the fact that combustion of natural gas releases about half as much carbon dioxide as generating the same amount of electricity by burning coal. But while combustion is the greatest source of climate emissions for oil and coal, recent research finds that natural gas' most significant climate impacts may occur before combustion ever takes place.



Methane leaks are invisible to the naked eye (above), but infrared imagery can reveal methane leaks (below), such as from this natural gas storage tank.



Studies Find High Methane Leaks

Recent studies relying on a variety of methodologies and looking at drilling in different places have found methane leaks high enough to significantly undercut any climate benefits from natural gas. A 2011 study by Professor Robert Howarth of Cornell University estimated that 3.8 percent of conventional natural gas is lost to the atmosphere and that 5.8 percent of gas obtained from shale formations is lost. Nationally, this would mean 1.5 trillion cubic feet of methane leaked in 2014, with a global warming impact equivalent to 251 coal-fired power plants. Other studies have confirmed leakage rates at least this high.

- A study of methane emissions in California – where, the authors contend, the “oil and gas infrastructure is arguably subject to the most comprehensive emissions control regulations in the U.S.” – found high emissions from conventional gas production. The authors estimated a leakage rate of 5.3 percent during production, processing, transmission and storage of natural gas in 2010.
- A 2015 study by Professor Howarth estimated that 12 percent of shale gas production is lost to the atmosphere, based on a 2014 study that relied on satellite data to estimate methane leakage from North American shale formations.
- Another study using satellite-based measurements documented a 30 percent increase in methane emissions in the past decade, particularly in the central U.S. where oil and gas production has increased.

Steps to Reduce Methane Emissions

The growing concerns about methane leaks from natural gas raise the level of urgency for California to address this source of global warming pollution. One critical step is to ban fracking because its high methane emissions are incompatible with the state’s climate protection goals. Instead, California should continue to focus on clean, renewable sources of energy – such as solar and wind power – that have unambiguous benefits for the global climate. For example:

- Installing rooftop solar energy equal to just 1 percent of Los Angeles’ solar potential would produce as much electricity as is generated by gas withdrawn from Aliso Canyon each year.
- Installing solar water heating on the roofs of 7 percent of Los Angeles’ multi-family homes would eliminate the demand for gas in buildings met through withdrawals from Aliso Canyon.

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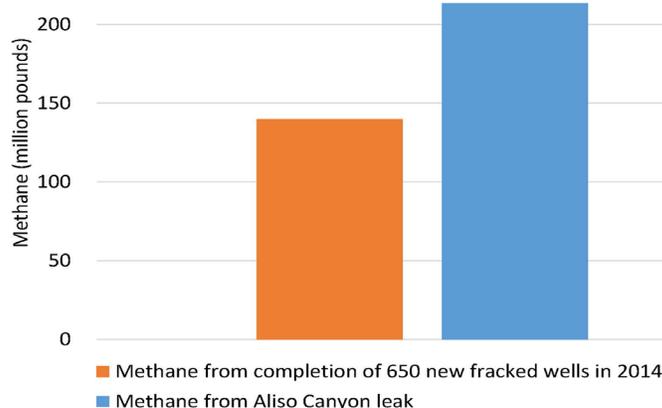
*For more information and the full report,
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Methane Pollution from Fracking in California

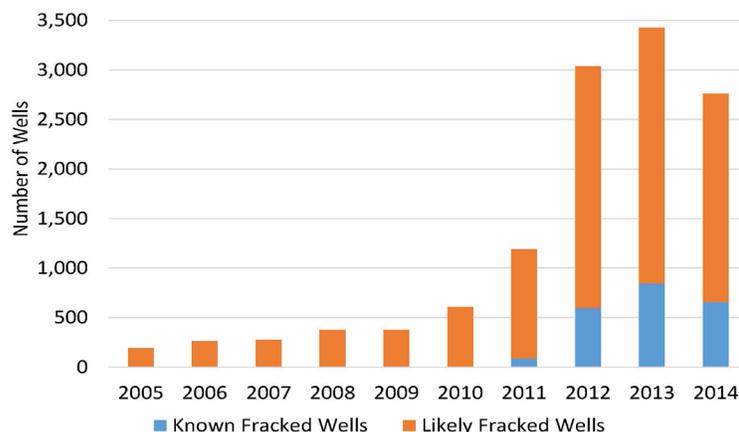
Figure 1. Methane pollution from fracking of 650 wells compared to Aliso Canyon leak



Fracking of California oil and gas wells routinely leaks methane into the atmosphere. In 2014, standard operations at 650 newly fracked wells in California released an estimated two thirds as much methane as the disaster at SoCalGas’ Aliso Canyon storage facility.

The climate impact of methane released by known fracked wells in 2014 is the same as if California removed all its residential solar panels, all its electric vehicles, and three utility-scale solar projects.*

Figure 2. Using a higher estimate of fracked wells would increase estimated methane emissions



Estimated methane emissions in this document are based on known fracked wells that were voluntarily reported to a national fracking database (blue data, above). The total number of fracked wells in California is likely higher, based on a proxy measure from state data (orange data, above). If the true number of fracked wells is higher than what has been reported to the national fracking database, then methane emissions likely are higher.

* Assumes that zero-emission electricity from solar panels would be replaced by electricity with emissions equal to the California state average, and that electric vehicles would be replaced by gasoline-powered vehicles.