

# Why utilities have little incentive to plug leaking natural gas

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The Aliso Canyon leak in California earlier this year focused public attention on methane emissions from the oil and gas industry.

Methane is the primary component of natural gas, and it is a potent contributor to climate change. In less than a year, the Aliso Canyon facility leaked methane equal to about four million metric tons of CO<sub>2</sub>, the greenhouse gas equivalent of driving over 800,000 cars in a year.

But the problem of methane leakage was hardly news to environmentalists and regulators, who have been following the problem for years. Indeed, the [EPA](#) this year introduced regulations to limit methane emissions from new oil and gas wells – and more initiatives are expected to be coming down the, er, pipeline.

Methane leaks occur throughout the natural gas supply chain – from the time it's collected, stored and transported until its use in a power plant, factory, home or business. The leaks can be from aging pipelines, but also from poorly fitted components and from intentional venting – a common practice in which gas is released directly into the atmosphere during maintenance.

The oil and gas industry has argued methane regulations are unnecessary and that the industry has already reduced emissions. For instance, a natural gas company might, quite rightly, point out that when natural gas is leaking from its system, it is losing valuable inventory, like a zoo with a hole in the fence. But, as I detail in recent research – coauthored with Lucija Muehlenbachs of the University of Calgary and Resources for the Future – this line of reasoning misses several key facts.

The lost value of leaked gas to a company is nowhere near the cost to society of the damages that same gas levies on the environment. This is a standard environmental externalities problem, straight out of an Econ 1 textbook. Because the company is not on the hook for the environmental damages, the natural gas company lacks the financial incentive to avoid a leak. This means environmental regulations, rather than leaving industry to self-regulate, are the best option for cutting emissions.

The magnitude of the problem for leaked natural gas is astounding. Consider recent prices of natural gas: at different points in the supply chain, the commodity is worth between two and five dollars per thousand cubic feet. But the societal cost of leaked, noncombusted natural gas is higher.

Economists and government agencies use a metric called the social cost of carbon to represent the benefits of climate change-related policies. I used this metric but adjusted it to reflect the fact that each ton of methane traps much more heat than a ton of CO<sub>2</sub>. Overall, I calculate that the societal cost of a natural gas leak is US\$27 per thousand cubic feet.

So imagine that a technology exists that will prevent leaks, but it costs \$10 per thousand cubic feet to implement. The private company won't implement that technology, although it would be worthwhile for society based on the social costs of methane.

Since 2005, natural gas prices have fallen by more than 50 percent. Over the last 30 years, prices have been this low only a handful of times. This downward trend in prices, thanks largely to a domestic natural gas

drilling boom, means the difference is growing between what a private company would be willing to spend to avoid methane leaks and what society would like to spend.

For a key portion of the natural gas supply chain, the private incentive to avoid natural gas leaks is even smaller. The final step in the supply chain is the distribution network, in which a firm – let’s call it “[Local Gas Co](#)” – brings natural gas from where a long-distance transmission line ends to your home or business. During my Michigan winters, I really appreciate the natural gas I can pipe into my home furnace. The company that provides this valuable service to me and other customers is typically regulated by a state-level agency called a public utility commission.

Because a utility like Local Gas Co is typically the only company providing gas to a given region, public utility commissions impose certain legal restrictions, including the regulation of prices, to protect customers. This is a model that has, for the most part, worked well in natural gas and electricity markets. It wouldn’t make sense to have multiple companies running their own natural gas pipelines down Main Street, but if only one company is going to serve an area, then customers need to be protected from monopoly pricing.

In practice, for most companies, this means that every so often, they report their costs to a state-level public utility commission, which then sets retail prices so that the company covers its costs of delivering fuel to homes and businesses. And now recall that when Local Gas Co runs gas through its pipeline networks, there are leaks along the way. This could be from aging buried pipelines or from surface facilities, such as the stations that transfer gas from transmission pipes to local distribution pipes.

Historically, Local Gas Co would have reported the value of this lost gas to the public utility commission, and it would have been counted as “a cost of doing business.” That is, Local Gas Co is fully reimbursed for the value of the product they sell: customers like us are paying for it. This leaves Local Gas Co with little financial incentive to minimize leaks.

It doesn’t have to be this way.

In our research, my coauthor and I point to cost-effective mitigation opportunities available to the distribution sector, such as repairing valves. But we estimate that the typical distribution company has ignored many of these opportunities. That’s not surprising, given the lack of financial incentive many of them face.

It’s worth noting that regulations are changing in some states. For example, reimbursement for the volume of leaked gas, in some places, is capped.

It’s also worth noting that safety regulations targeting aging networks are leading to major pipeline upgrades, and these replacements prevent some climate damages. But we estimate that pipeline replacements are substantially more expensive than other leak repair activities. That means they may be worth it for the safety benefits in some places, but on the climate change side, they are no substitute for leak detection and repair programs.

The overwhelming lesson we’ve taken from doing this research is that the price regulations we’ve relied on in the natural gas distribution sector are out of date given our current understanding of methane’s role in climate change.

Utility commissions and environmental regulators both face significant challenges going forward, such as attaining accurate and comprehensive measurement of methane leaks. But markets alone certainly won’t solve the problem.