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Comment of Andrew Campbell, Energy Institute at Haas

Additional submitted attachment is included below.

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Dear Mr. Franco:

Methane emissions from natural gas systems are an important target for California policymakers. Methane is known to be a potent greenhouse gas. However, the quantity and sources of methane emissions are not fully understood. Policy development is also very immature in this area. Policymakers need to carefully consider whether the regulated utilities that own and operate much of the state's natural gas infrastructure have the appropriate incentives to cost-effectively reduce methane emissions. The California Energy Commission (CEC), California Public Utilities Commission (CPUC), California Air Resources Board (CARB), and regional air quality management districts all have a role in supporting further research and policy development efforts in this area.

Policymakers should focus on improving the measurement of methane emissions. In the case of natural gas transmission and distribution infrastructure, better leak detection approaches are needed. More accurate measurement of the total quantity of natural gas entering and exiting the transmission and distribution system could also help. Policymakers should investigate the opportunity to use emerging sensor technologies including the communicating natural gas meters that now measure consumption for most California end use customers.

Without better measurement it is difficult for infrastructure owners and regulators to prioritize leak repairs and distinguish between economic and uneconomic repair opportunities. The state agencies participating in this effort should consider funding research, development and demonstrations to improve leak measurement.

Reducing methane emissions from the natural gas transportation systems is complicated by the regulated nature of the infrastructure owners. In general, the rates charged by interstate natural gas pipelines are regulated by the Federal Energy Regulatory Commission (FERC), and the rates charged by the intrastate natural gas transmission and distribution systems are regulated by the CPUC.

For the most part, the utilities that own and operate natural gas infrastructure do not lose money when natural gas leaks from the pipelines. The cost of the lost gas is instead borne by the gas shippers, in the case of FERC-regulated pipelines, and end-use customers, in the case of CPUC

regulated infrastructure. Cost pass-through mechanisms for lost gas are standard under traditional cost-of-service ratemaking. However, guaranteed cost recovery for lost gas undermines the economic incentive to prevent methane emissions.

With improved leak measurement, perhaps the cost recovery mechanisms can be modified so that the utilities experience financial losses when leaks increase and earn revenues when leaks are reduced.

Standard utility regulation may also skew incentives by encouraging utilities to prioritize high cost capital projects over lower cost repairs. Under standard utility ratemaking, the natural gas utilities earn a return on invested capital, yet they earn no return on operating expenses. This potentially creates a strong incentive to pursue high cost pipeline replacement programs, but causes the utilities to underspend on lower cost repair programs that are classified as operating expenses. Regulators should consider letting utilities earn a capital-type return on operating expense that reduce methane emissions so that lower cost repairs are undertaken.

Last year the Energy Institute at Haas published a blog discussing better ways to stop natural gas pipeline leaks. The blog is attached.

I look forward to the joint agencies stakeholder process.

Thank you.

Best Regards,

Andrew G. Campbell
Executive Director

ATTACHMENT

The following was originally published on March 9, 2015 on the Energy Institute at Haas blog and can be found at https://energyathaas.wordpress.com/2015/03/09/better-ways-to-stop-natural-gas-pipeline-leaks/.

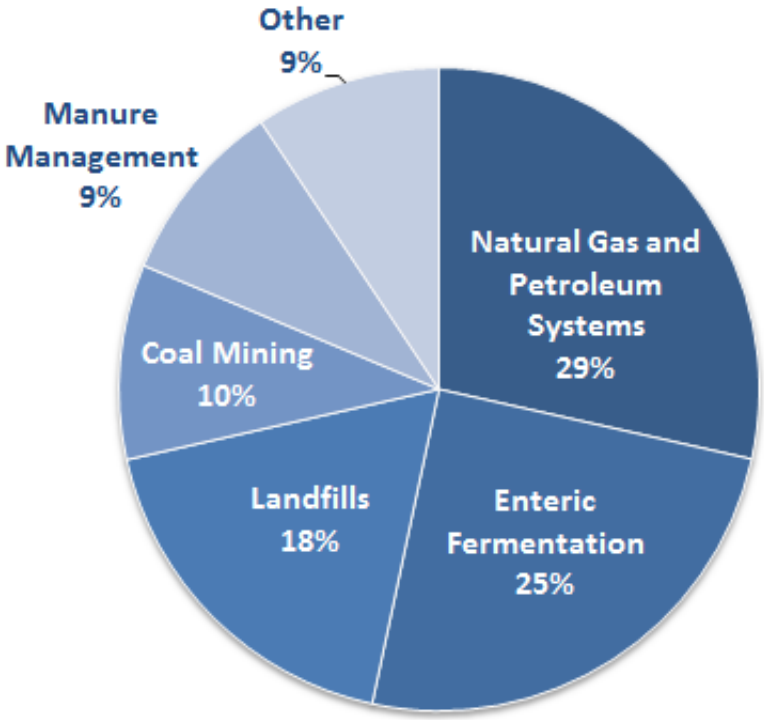
Better Ways to Stop Natural Gas Pipeline Leaks

Posted on March 9, 2015 by Andrew Campbell

Carbon dioxide has received the bulk of policymakers' attention as the villain of climate change. Now, its henchman methane is facing scrutiny.[1] Methane is an attractive target. It is much nastier than carbon dioxide in the atmosphere. Over one hundred years, a kilogram of methane has a 28-times greater impact on global warming than a single kilogram of carbon dioxide.

Unfortunately, designing practical policies to cut methane emissions is tough. Unlike carbon dioxide, which can be pinned on burning fossil fuels in power plants and vehicles, methane comes from millions of diverse sources. Methane comes from enteric fermentation (the technical term for cow burps), manure (cows again), landfills, and water treatment plants.

[1] The White House. (2015, January 14). FACT SHEET: Administration Takes Steps Forward on Climate Action Plan by Announcing Actions to Cut Methane Emissions.



U.S. methane emissions by source,http://epa.gov/climatechange/ghgemissions/gases/ch4.html

Nonetheless, the Environmental Protection Agency (EPA) is going ahead with regulations and has announced plans to go after the largest source of methane emissions—the oil and gas industry.[2] In 2013, methane leaking from natural gas systems was about 2.8% of total energy-related greenhouse gas emissions.[3] The prevalence of leaks may mean that natural gas generation is worse than coal-powered generation for climate change. Meredith explored this in a prior blog.[4]

To me it's a big puzzle why there's any methane leaking. Why is the oil and gas industry allowing one of its major products, natural gas, to float away into the atmosphere?

One explanation is that oil and gas producers are plugging some leaks, but not all because plugging all leaks is expensive. At some point, for private industry, the cost of repairs is not cost justified. The cost exceeds the market value of the gas saved. Policy could reduce leaks further by making the producers face the full social cost of the leaks, including the climate change impacts.

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[2] US EPA. (2015, January 14). FACT SHEET: EPA's Strategy for Reducing Methane and Ozone-Forming Pollution from the Oil and Natural Gas Industry.

[3] US EPA. (2015, April). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013.

[4] Fowlie, Meredith. (2013, December 9). Natural gas: Not all it's fracked up to be?. Energy Institute at Haas blog.

However, the part of the natural gas system that most worries me is the transportation network.

For the most part, the owners and operators of the transportation networks don't lose money when gas leaks from their infrastructure, and they don't benefit when they stop leaks. If the amount of gas delivered by a pipeline is less than the gas entering the pipeline, then the shipper, in the case of interstate pipelines, or the end-use customer, in the case of local distribution companies picks up the tab.

This occurs due to cost pass-through mechanisms. The rates charged by pipelines and distribution companies explicitly assume that some gas will be lost. If leaks increase or decrease, rates are adjusted so that shippers or customers continue to bear the cost.

This is a common arrangement in the world of utility regulation. Retail electric and gas utilities have fuel adjustment clauses that pass through changing fuel costs and decoupling mechanisms that pass through capital costs.

Recognizing that these incentive problems may be causing underinvestment in fixing the leaks, federal and state utility regulators are getting involved.[5]

The Federal Energy Regulatory Commission (FERC), which sets rates for the country's interstate natural gas pipelines, launched a new docket last November.[6] FERC proposes to allow pipelines to recover capital expenditures made to enhance reliability, improve safety and meet environmental objectives. This would be allowed outside of the normal rate-setting process.

In January and February FERC heard from interested parties. The pipeline owners love the idea of being able to collect the cost of repairs from customers. What utility wouldn't? The environmental groups want leaks reduced, but fret that the utilities will favor expensive capital fixes over low-cost operational solutions. The shippers are not

[5] FERC. (2014, November 20). Cost Recovery Mechanisms for Modernization of Natural Gas Facilities: Proposed Policy Statement. Docket No. PL15-1-000; CPUC. (2015, January 22). Order Instituting Rulemaking to Adopt Rules and Procedures Governing Commission-Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leakage Consistent with Senate Bill 1371. Rulemaking 15-01-008.

[6] FERC. (2014, November 20). FERC Proposes Policy on Cost Recovery for Natural Gas Facilities Modernization.

happy at all. They doubt the investments will be cost-effective and fear pipelines will spend money with abandon.

There's no obvious solution. The principal-agent problem persists with or without FERC's proposed policy. A pipeline's interests don't align with its shippers'.

What I find most jarring, however, is the lack of good empirical leak data. Regulators are developing policy in a data vacuum.

Turns out that the EPA depends on a 1996 study that is based on a very small number of leak measurements. Using the study, the EPA calculates "per mile" emissions factors for cast iron pipes, unprotected steel pipes, plastic pipes, etc. Then the EPA estimates total US emissions by multiplying the factors by the miles of each pipe type in service across the country. This recent report from the EPA's Office of Inspector General provides a critique of the EPA's emissions factors.[7]

A cast iron pipe that leaked (http://opsweb.phmsa.dot.gov/pipeline_replacement/)

The 1996 study may have been the best available in the past, but times have changed.

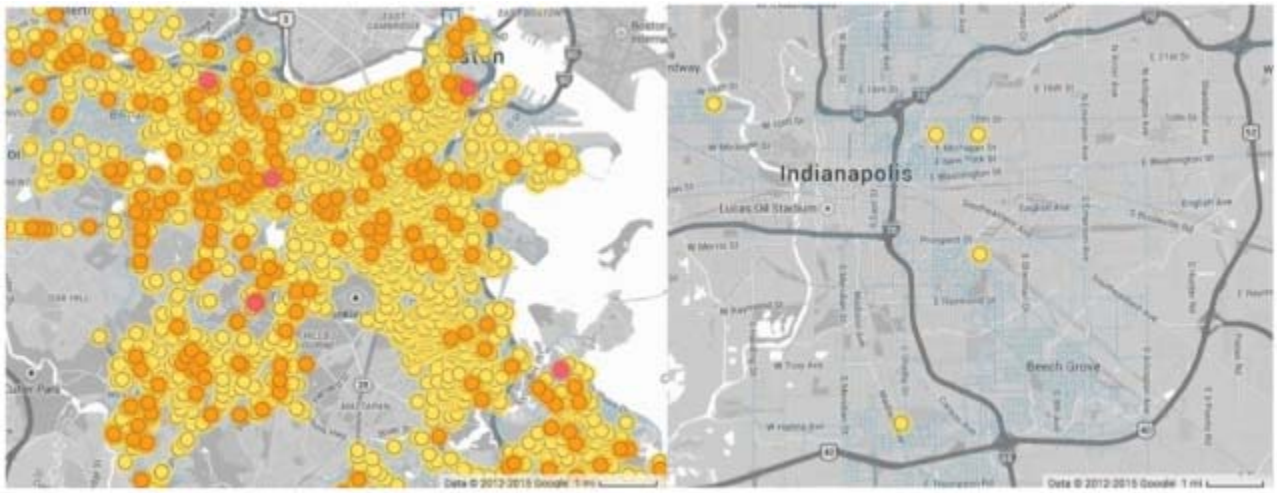
The rapidly falling cost of communicating sensors and cloud computing is enabling real-time measurement that was cost prohibitive in the past. This trend is called the "Internet

[7] US EPA Office of Inspector General. (2013 February 20). EPA Needs to Improve Air Emissions Data for the Oil and Gas Production Sector. Report No. 13-P-0161. Retrieved March 8, 2015 from https://www.epa.gov/office-inspector-general/report-epa-needs-improve-air-emissions-data-oil-and-natural-gas-production

of Things" or Industry 4.0, in the industrial context.[8] Now it's feasible to monitor natural gas pipelines and compressors at many locations on a real-time basis.

The value of lost gas is substantial. The DOE estimates that each year 110 Bcf per is lost from transmission infrastructure alone. That equates to over $300 million per year at current natural gas futures prices. Applying a social cost of carbon of $37 per metric ton of carbon dioxide, the cost exceeds $2 billion. Investments in sensors are easy to justify with so much value at stake.

The Environmental Defense Fund and Google have launched an initiative that demonstrates one new approach to leak monitoring. In city after city they are conducting drive-by leak surveys using car-mounted measurement devices.[9] Street View meets leak detection. In the sample maps below, each circle signifies a leak, with darker colors representing bigger leaks. The incidence of leaks varies significantly between and within cities.



http://www.edf.org/climate/methanemaps

Here at the Energy Institute we will soon be initiating a new project that will take advantage of new monitoring technologies in the industrial sector, to find energy saving opportunities.

[8] Wikipedia. Industry 4.0. Retrieved March 8, 2015 from http://en.wikipedia.org/wiki/Industry_4.0

[9] Environmental Defense Fund. Methane Maps. Retrieved March 8, 2015 from http://www.edf.org/climate/methanemaps

Better leak detection could enable entirely new policy options. The EPA could even pursue market-based approaches that charge utilities directly for the social cost of the leaked methane.

It’s time for natural gas utilities and their regulators to join the sensor revolution. Improving measurement of natural gas leaks is a great place for federal and state regulators to start.