

Marcellus Shale gas cleaner than coal, CMU study says

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By Don Hohey, Pittsburgh Post-Gazette

Burning Marcellus Shale gas instead of coal to generate electricity could reduce emissions of climate change-producing greenhouse gases by 20 to 50 percent, a recent Carnegie Mellon University study concluded.

The study, published Aug. 5 in the peer-reviewed "Environmental Research Letters," also found that Marcellus Shale gas has only a marginally larger greenhouse gas footprint when compared with conventional natural gas production.

This was said to be largely due to emissions related to the transportation and treatment of millions of gallons of water used to hydraulically fracture the rock and release the gas.

"Shale gas is better than coal when it comes to electricity generation," said Paulina Jaramillo, an assistant research professor in CMU's Engineering and Public Policy Department and one of six authors of the study. "We looked at the life cycle of gas and coal emissions, and even though methane emissions from gas are higher than from coal, the combustion emissions from coal really overwhelm them."

The study's findings estimating the life cycle greenhouse gas emissions of the two fossil fuels is different than a Cornell University study in April that said shale gas methane emissions are as harmful or more harmful than carbon dioxide emissions from coal combustion.

But the Cornell study uses different assumptions for drilling, fugitive gas emissions and power plant combustion efficiencies. It's also based on a 20-year global warming potential for greenhouse gas emissions instead of the CMU study's 100-year time frame.



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Ms. Jaramillo said the shorter time frame of the Cornell study gives more weight to methane emissions, reducing the environmental advantage of gas as a fuel.

Carbon dioxide emissions can stay in the atmosphere 10 times as long as methane, but methane can have more of an effect in the short term.

The CMU study's wide range of emissions reductions from Marcellus -- between 20 and 50 percent -- was necessary, Ms. Jaramillo said, because of the uncertainty of how much gas each Marcellus well will produce during its lifetime. If per-well gas production is lower, that means higher amounts of emissions per unit of gas produced.

Methane emissions from Marcellus well development could be significantly reduced, the study said, if drilling companies captured the gas from completed wells instead of flaring or venting it.

And flaring is better than venting, because it reduces the amount of methane released directly into the atmosphere, Ms. Jaramillo said.

The natural gas drilling industry touted the CMU study, claiming it refuted the Cornell study findings.

Lou D'Amico, president and executive director of the Pennsylvania independent Oil and Gas Association, said in an email that the CMU study "documents the significant environmental advantage of Marcellus Shale gas over coal," adding that the Cornell study was "rife with inaccuracies."

But Deborah Nardone, Natural Gas Reform Campaign director for the Sierra Club, which provided partial funding for the CMU study, said the key points of the two studies compliment one another.

"The CMU study says we need to control fugitive emissions and that methane from natural gas production is a potent greenhouse gas that needs to be controlled," Ms. Nardone said. "Natural gas is not the panacea the industry claims it is. It has a role as we transition into renewable energy sources, but it still has problems."

The Sierra Club's national energy policy goal is to develop and use as little natural gas as possible, and it notes that while

natural gas is cleaner than other fossil fuels, it isn't clean.

According to the CMU study, development and completion of a typical Marcellus Shale well results in methane emissions the equivalent of 5,500 tons of carbon dioxide.

Ms. Jaramillo said the comparisons of the Cornell and CMU findings are distracting from more important questions about water supply and quality, wastewater disposal and pipeline infrastructure construction.

"Those discussions are going to be more critical to Marcellus development," she said. "The study found Marcellus gas development is not as bad as coal and is not much different than conventional natural gas. So let's not base development decisions on greenhouse gas emissions."

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