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THE HILL'S Energy & Environment Blog

### Study: Gas from 'fracking' worse than coal on climate

By Ben Geman - 04/10/11 02:40 PM ET

Cornell University professors will soon publish research that concludes natural gas produced with a drilling method called “hydraulic fracturing” contributes to global warming as much as coal, or even more.

The conclusion is explosive because natural gas enjoys broad political support – including White House backing – due to its domestic abundance and lower carbon dioxide emissions when burned than other fossil fuels.

Cornell Prof. Robert Howarth, however, argues that development of gas from shale rock formations produced through hydraulic fracturing – dubbed “fracking” – brings far more methane emissions than conventional gas production.



Enough, he argues, to negate the carbon advantage that gas has over coal and oil when they're burned for energy, because methane is such a potent greenhouse gas.

“The [greenhouse gas] footprint for shale gas is greater than that for conventional gas or oil when viewed on any time horizon, but particularly so over 20 years. Compared to coal, the footprint of shale gas is at least 20% greater and perhaps more than twice as great on the 20-year horizon and is comparable when compared over 100 years,” states the upcoming study from Howarth, who is a professor of ecology and environmental biology, and other Cornell researchers.

The Hill obtained a [pre-publication version of the study](#), which is slated to run in the journal *Climatic*

*Change.*

It is drawing immediate pushback from industry-aligned experts, who question key assumptions.

The environmental effects of producing gas from shale rock formations – in states including Pennsylvania, Texas and Arkansas – is drawing careful scrutiny as development booms.

The Energy Information Administration – which is the Energy Department’s statistical arm – estimates that shale gas will account for 45 percent of total U.S. gas supply in 2035, up from 14 percent in 2009.

The study concludes that shale gas developed through fracking carries a higher greenhouse gas footprint because the “fugitive” methane emissions at the fracking sites are greater than releases from conventional gas wells.

Fugitive methane from other steps in the development process – transport, storage and so forth – are comparable to conventionally produced gas, the study states.

In essence, the Cornell study argues that methane emissions from these shale gas projects mean that shale gas ultimately brings climate consequences comparable to coal over a century, and worse than coal over two decades.

That’s because the potent methane emissions in the production process more than compensate for the fact that burning natural gas for power brings far fewer carbon dioxide emissions than burning coal. The study also notes that, depending on the estimates used, conventionally produced gas may add more to climate change than coal over the 20-year horizon.

But experts from the energy consulting firm [M.J. Bradley & Associates](#) are questioning the study.

“It needs to be understood as a study that has several key assumptions that are highly uncertain or based on limited data points,” said Christopher Van Atten, a senior vice president with the firm.

M.J. Bradley’s client base includes gas industry clients.

Among Van Atten’s criticisms, the study is overstating methane’s potency as a greenhouse gas, he argues. Van Atten, in an email, notes that the paper assigns a higher global warming potential to methane than the United Nation’s Intergovernmental Panel on Climate Change. He also questions the report’s emphasis on the climatic effects of methane over a 20-year horizon.

“They focus some of their results on a 20 year period which is not particularly relevant in terms of climate change. Methane only lasts in the atmosphere for about a decade, co2 remains in the atmosphere for about a century. By focusing on the shorter timeframe, they show a greater impact from the shorter lived chemical,” he said.

But the study notes that “the 20-year horizon is critical, given the need to reduce global warming in coming decades.”

Fracking involves high-pressure injections of water, chemicals and sand into rock formations, which opens cracks that enable trapped gas to flow. Use of fracking in shale formations is enabling expanded production, but bringing concerns about water contamination along with it.

Natural gas enjoys political support from the Obama administration and many lawmakers. Obama praised natural gas – while highlighting federal efforts to ensure fracking is done safely – during a high-profile energy speech late last month.

“Recent innovations have given us the opportunity to tap large reserves — perhaps a century’s worth of reserves, a hundred years worth of reserves — in the shale under our feet,” Obama said at Georgetown University.

Obama has touted the potential of natural gas for use in vehicles, in addition to its role in power generation (natural gas currently produces around a fifth of U.S. electricity).

His proposed “clean energy standard,” which would require utilities to greatly expand the supply of power from low-carbon sources, includes partial credit for natural gas.

More broadly, many gas supporters see domestic reserves as a “bridge” fuel while alternative energy sources are brought into wider use.

Howarth’s study questions this idea.

“The large GHG footprint of shale gas undercuts the logic of its use as a bridging fuel over coming decades, if the goal is to reduce global warming,” the study states.

But Van Atten also notes that gas has other advantages over coal as an energy source, due to its lower emissions of conventional pollutants including nitrogen oxides and sulfur dioxide.

The study cautions that the research is not meant to justify continued use of oil and coal, but rather to show that using shale gas as a substitute might not provide the desired checks on global warming.

Howarth and Cornell engineering Prof. Anthony Ingraffea, who also worked on the study, acknowledged uncertainties in the nexus between shale gas and global warming in a presentation last month.

“We do not intend for you to accept what we reported on today as the definitive scientific study with regard to this question. It is clearly not. We have pointed out as many times as we could that we are basing this study on in some cases questionable data,” Ingraffea said at a mid-March seminar, which is [available for viewing](#) on Howarth’s website.

“What we are hoping to do by this study is to stimulate the science that should have been done before, in my opinion, corporate business plans superceded national energy strategy,” he added.

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