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Frack: Is Shale Natural Gas Worse for the Climate Than Coal?

Posted by **BRYAN WALSH** Monday, April 11, 2011 at 6:13 pm

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Natural-gas pipelines in California Credit: Larry Lee Photography / Corbis

Natural gas is riding high. Long an overlooked energy source, gas is suddenly front and center in the energy picture—in a [presidential address](#), in the [business world](#), on the cover of *Time magazine*. That's mostly due to shale gas—new deposits of natural gas found throughout much of the country, and tapped via hydraulic fracturing. By some estimate the U.S. may have up to a century's worth of gas reserves based on current consumption, and it's not just here—as the [Energy Information Administration recently announced](#), there are vast amounts of shale gas deposits found around the world, enough to increase global reserves by as much as 40%. A [Washington consensus](#)—one that included both parties, industry and [many environmentalists](#)—emerged around natural gas as a safer, cheaper and greener bridge fuel, something domestic to bring us part of the way to a clean energy system. In a world where the future of nuclear is hazy post-Fukushima, and the coal is increasingly opposed for its pollution, natural gas seemed like a safe bet.

But that consensus depends on natural gas's [image as a green fuel](#)—and a new study is casting doubt on that image. Cornell researchers Anthony Ingraffea and Robert Howarth [have a study](#) forthcoming in the journal *Climatic Science* that says shale gas has a bigger carbon footprint than coal in the short-term, and is comparable over the long-term. (The study was first obtained by *The Hill*.) That directly contradicts the [industry position](#) that natural gas has one-half the carbon footprint of coal.

It's not that the burning of natural gas itself produces more greenhouse gases than the burning of coal. Rather, Howarth and Ingraffea have looked at the total life cycle of shale natural gas production, including the drilling and fracking of wells and the transport of gas, and they found that much of the methane in shale gas production escapes into the atmosphere, instead of being captured and used for fuel. Quite simply, the gas leaks, from pipelines and wells and processors. That's bad news for the climate—methane is the chief component of natural gas, and it is [more than 20 times potent](#) as a greenhouse gas than carbon dioxide.

Scientists and industry alike have been aware of such fugitive methane emissions, but they were considered relatively minor. Howarth and Ingraffea's work, however, suggests that as

much as 7.9% of the methane in a well may escape into the atmosphere—numbers that, if correct, would significantly damage natural gas's position as an environmentally friendly fuel, at least from a climate perspective. (The researchers also include data from [a recent study](#) from NASA making the case that methane can interact with aerosol particles in the atmosphere in a way that amplifies methane's warming impact, especially in the short-term.) As Howarth [said in a statement](#):

The take-home message of our study is that if you do an integration of 20 years following the development of the gas, shale gas is worse than conventional gas and is, in fact, worse than coal and worse than oil. We are not advocating for more coal or oil, but rather to move to a truly green, renewable future as quickly as possible. We need to look at the true environmental consequences of shale gas.

Industry has [sharply criticized](#) the study and Howarth himself, who opposes increasing gas development in New York state. (In fact, the Independent Petroleum Association of America [wrote to the](#) Environmental Protection Agency arguing that Howarth was too critical of the natural gas industry to serve on the EPA's scientific advisory board for an upcoming study on hydraulic fracturing.) Energy in Depth (EID), a gas industry trade group, lays out the case [against the paper](#), arguing that Howarth overstated the impact of methane as a greenhouse gas, and based the study on sketchy data. Chris Tucker of EID [told Greenwire](#):

Reading the paper, it's tough not to get the impression that the fix was in from the start, that they set out with a series of conclusions and then just worked backward from there, moving the parameters in and out as needed to get where they wanted to go.

This isn't the first time Howarth has raised concerns about the carbon footprint of shale gas. About a year ago, he came out with a draft paper that [began to outline](#) the life cycle carbon emissions of natural gas, and compared it to coal—though he [failed to note initially](#) that coal mining can also release significant amounts of methane into the atmosphere. But this paper has gone through the peer review process, and it echoes some other recent reassessments of gas's climate impacts. The EPA [published research](#) in January that estimated natural gas might only be 25% cleaner than coal on a climate basis, once the full cycle of gas production was taken into account. Abraham Lustgarten [reported in ProPublica](#) that the EPA doubled its estimates of the amount of natural gas that leaks from pipe fittings or is vented from wells, while methane levels from fracking were 9,000 times higher than previously reported. As Lustgarten wrote, those numbers complicate the picture on natural gas:

Even accounting for the new analysis, natural gas—which also emits less toxic and particulate pollution—offers a significant environmental advantage. But the narrower the margins get, the weaker the political arguments become and the more power utilities flinch at investing billions to switch to a fuel that may someday lose the government's long-term support.

Indeed, when I asked [Duke Energy CEO Jim Rogers](#)—who runs one of the largest utilities in the U.S.—about the potential of shale gas, he wondered about the long-term environmental risk:

What if we put in all these additional gas plants, and then it turns out that shale gas produces too much waste and too much CO₂? We'd end up hooked on gas.



Still, it's important to put gas in perspective as an energy source. Even if Howarth's analysis turns out to be right—and he admits the study is preliminary, not the final word on the subject—there are ways to significantly reduce methane leakage and shrink gas's carbon footprint.

The EPA's [Natural Gas STAR program](#) works with industry to reduce fugitive methane emissions—in 2009, companies involved in STAR prevented the equivalent of 34.8 million metric tons of CO₂. A new [EPA rule will require](#) natural gas facilities to report their vented and fugitive methane and carbon emissions, which should at the very least provide more data for a full picture of the total life cycle of natural gas. And it's worth remembering that greenhouse gas emissions aside, natural gas is cleaner on a pollution basis than coal with its mercury and sulfur and other pollutants. (One report from the Clean Air Task Force [estimates that coal use](#) led to 13,200 premature deaths in 2010, with Pennsylvania—the heart of shale gas land—leading the nation.) Shale gas production can and must be cleaner—both in terms of climate pollution and in the [concerns over water contamination](#) and spills. But it's coal, even after this study, that remains the number one environmental enemy.

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Bryan,

Thanks for highlighting the Cornell study. Shale gas just keeps getting bad news heaped on it, as big oil tries relentlessly to spin the positives.

I think that it is interesting that an esoteric process like fracking is getting so much attention in mainstream media. And that's a good thing. It is important that the public stay on top of the nuances on these issues, especially with the GOP trying to deny climate change, and stop the EPA from protecting the environment and public health.

I put together some stunning video and summaries of stories on fracking that appeared in Blomberg, Vanity Fair, and HBO. See:

http://8020vision.com/2010/07/06/shale-gas-exploration-the-coming-storm/

Jay Kimball

8020 Vision

jaykimball

April 11, 2011

at 7:26 pm

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MURRAY JENNEX, an associate professor at San Diego State University, after Japan raised the severity level of its nuclear crisis at the Fukushima plant to the maximum of seven, on par with Chernobyl

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