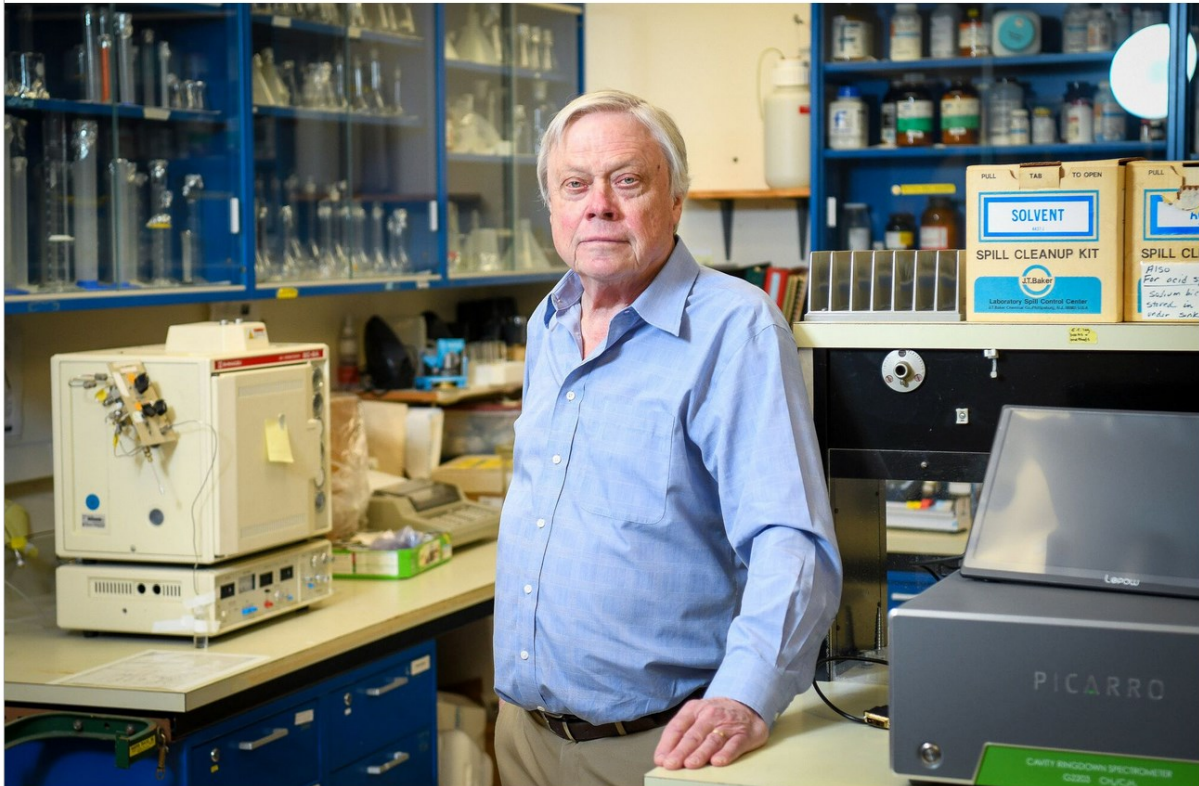


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How One Methane Scientist Influenced Biden's Pause on LNG Approvals

Cornell University professor Robert Warren Howarth says methane emissions from American LNG supply chains make the fuel as bad or worse for the climate than coal.



Robert Warren Howarth Photographer: Heather Ainsworth/Bloomberg

By [Aaron Clark](#)

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When the [Biden administration](#) paused approval of new liquefied natural gas export licenses in January, the decision was driven by a recognition that the climate impact from the fossil fuel needs to be reassessed.

The fight over just how much LNG contributes to global warming was rekindled in part by a [study](#) with explosive findings. Compiled by [Robert Warren Howarth](#), a professor at Cornell University, the analysis – which was released in October but remains in peer review – uses leak and emissions data from an array of sources. It finds that total

greenhouse gas emissions from US LNG in the best case scenario are comparable to coal. In the worst case, emissions could be more than two-fold greater.

Understanding how much of the potent greenhouse gas escapes from the giant intercontinental network of wells, pipelines and ships is now one of the central questions of the energy transition and an emerging climate battleground. Despite years of research many scientists and the Biden administration believe that question hasn't been sufficiently answered.

The argument that LNG, which generates about half the carbon dioxide of coal when combusted, is relatively less damaging to the climate hinges on an important caveat. To have a lower warming impact than coal, only a minuscule amount of methane – the primary component of fossil gas – can leak as it moves through vast global supply chains that often begin at wellheads in the scrublands of Texas and Oklahoma and span thousands of miles across oceans, to furnaces and power stations in cities from Shanghai to Hamburg.



"Natural gas really is not a bridge fuel or really isn't any better for the climate than coal," Howarth said in an interview. *Photographer: Heather Ainsworth/Bloomberg*

But there are also opportunity costs that are less binary. Are US LNG shipments displacing coal generation or channeling money and resources that could have been gone toward clean energy projects? The context of alternatives, many scientists argue, also matters.

Howarth's study was "clearly was a factor in the Biden administration's decision to pause making the required determinations required for approval of new LNG export projects at launching a U.S. Department of Energy study of the climate impact of LNG exports," said Steven Hamburg, chief scientist at the Environmental Defense Fund who has served as a lead author for the Intergovernmental Panel on Climate Change.

The findings were troubling because they suggested that leaking and intentionally emitted methane is having a much larger climate impact than previously understood. A White House spokesman didn't respond to requests for comment. Five scientists including Hamburg declined to comment on the paper's findings because it hasn't yet completed peer review.

Methane is up to 80 times more potent than CO₂ over a 20-year period, but its warming power falls to around 30 times more than CO₂ over 100 years as it degrades. Howarth firmly believes the shorter timeframe more accurately reflects the climate danger posed by natural gas, which informs his research. Using that metric alone, his latest analysis shows that LNG generates at the very least 27% more CO₂-equivalent emissions than coal.

Many studies looking at methane emissions from fossil fuel supply chains have found the numbers are underreported. In a recent global analysis, scientists estimate that methane releases from the oil and gas industry are 30% higher than what countries report to the United Nations under the Paris Agreement.

That deeper understanding of just how much of the invisible and odorless gas leaks and is deliberately emitted is being driven in part by a wave of new satellites and aerial surveys that have given scientists far more insight into the scope of methane released from fossil fuels. For some, the latest data has helped unlock the ability to compare climate tradeoffs between US LNG and other energy sources under different warming scenarios.

For Howarth, the latest data offers conclusive evidence that natural gas isn't a climate solution. "My belief is that we've documented that natural gas really is not a bridge fuel or really isn't any better for the climate than coal," he said. "We need to get rid of all fossil fuels as quickly as possible. Let's just move on and get rid of the gas system."

IT'S NOT THE FIRST TIME HOWARTH, WHO TURNED 72 IN FEBRUARY, HAS BEEN THRUST INTO the spotlight.

In 2011, he published a paper estimating that between 3.6% and 7.9% of fracked shale gas in the US at the time was spewing into the atmosphere and increasing methane levels. The analysis estimated emissions across the supply chain, from wellheads to large pipeline

transmission systems down to the smaller distribution networks that transport the fuel into homes and businesses for things like heating and cooking.

The report was published in *Climactic Change* just a few weeks after President Barack Obama expressed support for expanding gas drilling and according to Howarth, “did a remarkably good job of stirring up the hornet's nest.”

The New York Times covered Howarth’s 2011 study while its conclusions faced pushback from US energy policy and industry circles. Former Council on Foreign Relations fellow Michael Levi said at the time that the analysis was “based on extremely weak data” and “there is simply no way to know (without access to much more data) if the numbers he uses are at all representative of reality.”

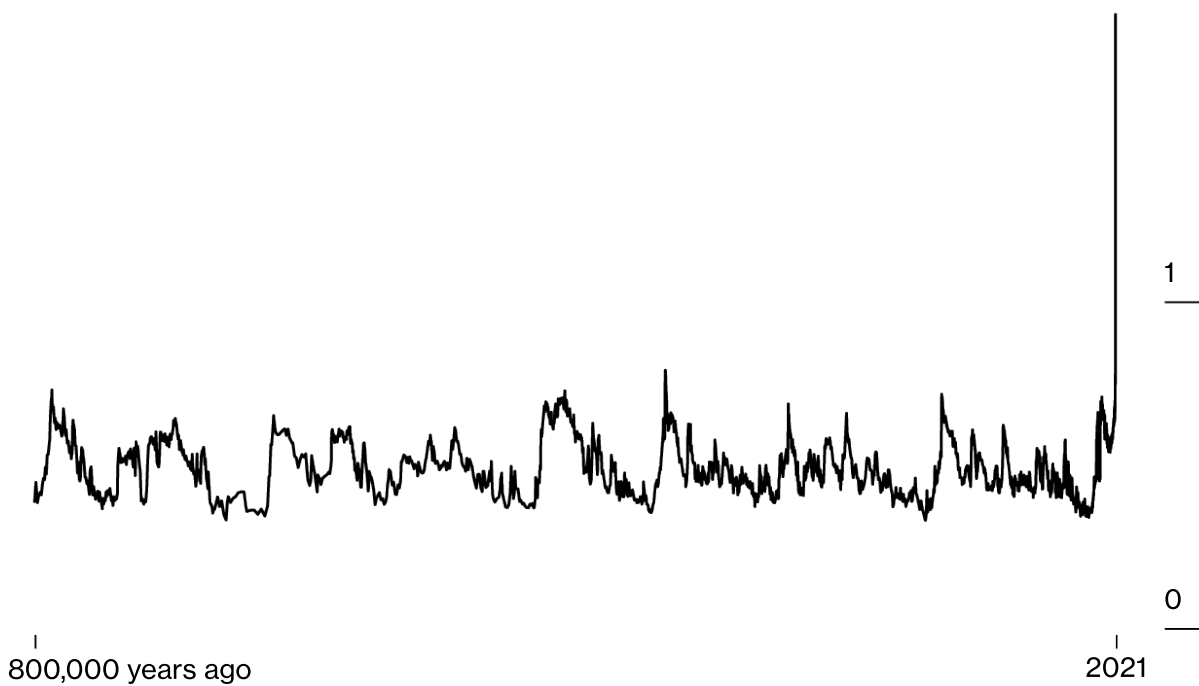
Howarth said data available at the time was “not great” but emphasized that he explicitly called for independent scientists to make better measurements and that this was the result. Since its publication, the paper has been cited in more than 1,800 other studies, he added. In 2022, he published a review of estimates that found, on average, that about 2.6% of upstream and midstream gas was being lost to the atmosphere. A highly regarded 2018 study estimated that 2.3% of gross US gas output was being emitted.

Some industry-funded groups charge that Howarth's analysis ignores important research. In his latest paper, he omits a LNG life-cycle analysis from the Department of Energy’s National Energy Technology Laboratory that found US LNG exports for electricity generation in European and Asian markets would not increase greenhouse gases from a life cycle perspective compared to regional coal production for power generation.

Methane hits unprecedented levels

Atmospheric levels of the greenhouse gas are 2 1/2 times higher than at any point in at least 800,000 years

2K parts per billion



Sources: US Environmental Protection Agency; National Oceanic & Atmospheric Administration

The NETL study relied on “self-reported estimates from the oil and gas industry, with no verification,” he said in an email. “The peer-reviewed literature is full of analyses showing that this severely underestimates emissions.”

Some operators are trying to build trust and accountability around their emissions and two dozen US companies have joined the United Nations' Oil & Gas Methane Partnership 2.0 reporting program that requires members to establish company-wide methane release reduction targets.

As part of the Biden administration's pause for new LNG export licenses, the DOE is updating its economic and environmental analysis that helps support reviews of export applications with assistance from its national labs, including NETL. The effort will build on NETL's lifecycle analysis of greenhouse gas emissions from LNG exports not used by Howarth and the wider analysis will be open to public comments prior to finalization.

“All of our 17 national labs, including NETL, are committed to full and open scientific exchange,” a DOE spokesperson said. “We have confidence that the scientific community practices of communication, publication, peer review, and free exchange of information result in a robust and objective understanding of the scientific facts.”

Howarth is open about his motivation to influence US energy policy through his work, and he advocates for a rapid transition to renewables and electrifying infrastructure as quickly as possible.

“I firmly believe that policy should be based on the best available information, and in many cases this includes scientific research,” he said, adding, “I believe science should inform policy. That is central to my career.”

He decided to release his LNG study before it underwent peer review after a conversation with environmentalist and journalist Bill McKibben, who wrote about it in the New Yorker. According to Howarth, McKibben told him that if he waited to make results from his paper public until after the peer review process, which could take until spring or summer, that would mean missing the opportunity to impact US policy decisions on LNG expected in the first part of this year. “I thought, well, okay, he's right,” said Howarth.

While Howarth’s studies tend to be firmly planted on one side of the methane research spectrum, there is little doubt that his analysis has helped trigger a wider conversation around the climate impact of fossil gas and the need for more comprehensive study and analysis of methane leakage from LNG supply chains. It’s an opening many scientists are embracing.

“Answering the question of what impact US LNG exports have on the global climate requires a sophisticated technical and economic analysis drawing on measured, peer-reviewed data,” said EDF’s Hamburg. “I’ve yet to see a comprehensive study of this type from industry, government, or academia, which is what makes the administration’s decision so necessary and welcome.”

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