DAILY COMMENT

A SMOKING GUN FOR BIDEN'S BIG CLIMATE DECISION?

A new analysis suggests that L.N.G. exports may well be worse for the environment than burning coal.

By Bill McKibben

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Photograph from The Washington Post / Getty

The Biden Administration faces one of its most profound climate choices this autumn: Should it continue to allow the expansion of liquefied-natural-gas exports, or should it halt the rapid buildout of this industry at least until it can come up with new guidelines? The stakes are enormous—the buildout of L.N.G. infrastructure in the United States is by far the largest example of fossil-fuel expansion currently proposed anywhere in the world. But there's some new data that may make the Administration's choice easier—or certainly starker.

The data are from an analysis by Robert Warren Howarth, a professor of ecology and environmental biology at Cornell who is one of the world's premier methane scientists. The analysis attempts to establish the greenhouse-gas footprint of L.N.G. exported to Europe and Asia, and the numbers presented are astonishing. Coal-fired power has long been the standard for measuring climate damage: when burned, coal releases carbon dioxide into the air in large quantities. In recent years, Howarth has demonstrated that, domestically, natural gas is no better for the climate than coal, largely owing to the methane leaks associated with it; now, though, it appears that exporting L.N.G., because of the extra leakage of the supercooled gas during transit, could allow even larger amounts of methane to escape into the atmosphere and, hence, could do much more damage to the climate than coal does. The leaks come at every stage of the process, Howarth explains. Even once the gas is compressed aboard ship in insulated tanks, some of it "boils off" as heat leaks through the insulation. Newer tankers try to burn that boiled-off methane for fuel, but even then, Howarth says, some of it is emitted unburned in the exhaust stream. He notes, "It all adds up."

Howarth models a number of different scenarios, varying for how far the L.N.G. travels and how much methane might be released. According to his calculations, even when the gas is delivered with the most modern ship, taking the most direct route, the greenhouse-gas emissions from the entire ground-to-combustion life cycle of L.N.G.—from the fracking wells, to the pipelines, the liquefaction stations, the ships, and the final combustion—are twenty-four per cent worse than those caused by digging up and burning an equivalent amount of coal. (The worst cases—long voyages in old vessels burning lots of oil—show an impact two hundred and seventy-four per cent worse.) Howarth, however, is careful to point out that, though his paper has been submitted to a peer-reviewed journal, the review process has not yet been completed. "It is always possible I have made a mistake or two," he told me. "Hopefully not large." But, assuming that the thrust of the data stands, it undercuts the L.N.G. proponents' key argument—that at least it's cleaner than coal. Howarth concludes his paper by saying that "ending the use of LNG must be a global priority."

As I wrote earlier this year, L.N.G. exportation is relatively new for the United States. The first big cargoes didn't leave facilities on the Gulf Coast (close to the Permian Basin, one of the largest repositories of gas in the world) until 2016. But the industry has grown rapidly, and the U.S. is now the largest exporter of natural gas in the world. So far, seven big export terminals have been built, most of them along the Gulf Coast, and at least twenty more are planned. According to the energy consultant and former Environmental Protection Agency climate-policy

adviser Jeremy Symons, if all of them are built, they will be associated with an extra 3.2 billion tons of greenhouse-gas emissions annually, which is close to the entire annual emissions of the European Union, from every car and house and factory from the northernmost Finnish village to the southernmost Greek isle. "It's an unbelievable amount of pollution and it would spell game over for a livable planet as we've known it," Symons recently told the *Guardian*.

Faced with such findings, the industry has fallen back on claims about relative, as opposed to absolute, emissions. After my previous piece appeared, a spokesperson for Venture Global, the company behind the largest of the proposed export terminals on the Gulf, said that "the well-funded environmental activists opposing CP2 and all US LNG projects are completely out of touch with reality." She added, "Ironically, Mr. McKibben and other activists who claim to want to lower global emissions are actually advocating for restricting access to a cleaner form of energy and denying energy security to millions of people. This would only result in continued and increased coal use and prevent the reduction of global emissions."

Laying aside the "well-funded" part (I have always worked as a volunteer at Third Act and 350.org, the two climate organizations I founded, and, taken together, their budgets are a tiny fraction of the billions of dollars in revenue these gas exports bring in annually), the "reality," according to Howarth's paper, is that L.N.G. sends global emissions up, even compared with coal. Here's a relevant chart from Howarth, showing how even the cleanest exported L.N.G. could be worse for the climate:

Howarth goes as far as to say that "short-term energy needs," in an emergency such as the invasion of Ukraine, "are better met by reopening closed coal facilities, on a temporary basis, than by expanding LNG infrastructure."

The fact that this analysis comes from Howarth is key, because he's been proved right over and over again. He and two colleagues then at Cornell, Anthony Ingraffea and Renee Santoro, began researching the climate implications of methane emissions from oil and gas production in 2009, and a year later they started publishing their findings in scientific journals. (I wrote some accounts of that work for *The New York Review of Books*.)

At that time, fracked natural gas was widely regarded as a solution to the climate crisis. In several State of the Union Messages, President Barack Obama lauded the spread of fracking, and his State Department set up a special bureau that spread the technology abroad. "The natural-gas boom has led to cleaner power and greater energy independence," Obama said, in 2013. "We need to encourage that. And that's why my Administration will keep cutting red tape and speeding up new oil and gas permits." Even environmentalists agreed; the then executive director of the Sierra Club toured the country with the head of one of the largest fracking firms, praising the new technology. (The Sierra Club has since become a staunch opponent of natural-gas expansion.) That support was based on the fact that, when you burn natural gas in a power plant, it produces half as much carbon dioxide as burning coal does. So, if the goal was simply to drive down carbon-dioxide emissions, replacing coal with natural gas would perhaps have been the bridge to a renewable future that proponents claimed.

The problem is that the other prime culprit in global warming is methane, CH_4, which so far is responsible for as much as forty per cent of global warming, and natural gas is mostly methane. Early work by Howarth and his team established that it was likely that methane was leaked especially from explosively fracking shale rock to get at the gas, and that the damage from those escaping molecules likely outweighed the benefit that came from switching off coal: additional research by more scientists suggested that the break-even point at which gas became worse than coal was a leak rate somewhere around two or three per cent. Those findings were not readily welcomed. As Obama's former Energy Secretary Steven Chu said, in 2013, "There was a very famous Cornell report which we looked at and decided it was not as credible as it—well, we didn't think it was credible. I'll just put it that way."

Year after year, however, new data collected from overflights of fracking fields, patrols of urban pipelines, and, most recently, satellite measurements confirmed the Cornell data: leakage rates were high enough to make natural gas unnaturally dangerous. By 2016, a Harvard team had published satellite data showing that

methane emissions in the U.S. had spiked thirty per cent since 2002, a period that almost perfectly coincided with the advent of fracking for gas.

During the Trump Administration, even federal efforts to slow down leaks, such as by tightening operations at wellheads and pumping stations, were largely abandoned. Those efforts have resumed under President Biden, and the big fossil-fuel players have continued to bet on a fracked-gas future: earlier this month, ExxonMobil bought Pioneer Energy, one of the largest frackers in the Permian Basin. But the biggest boom has been in exports, especially since Russia went to war in Ukraine. And that's where Howarth's data hit so hard.

They join other data that have emerged in the past few weeks. A new working paper from a team led by Douglas Almond, an economist at Columbia University, shows that satellites can now pick up a methane bloom when L.N.G. carriers unload in European ports. (Howarth, though, in his usual cautious fashion, thinks that the actual amount of leakage during off-loading may be small, and does not include it in his analysis.) And the climate folly of building new fossil-fuel infrastructure has been highlighted for Gulf residents by this month's global-warming problem: the dwindling flow of a drought-plagued Mississippi is letting salt water well up the river, threatening local drinking-water supplies.

So the pressure on the Administration continues to grow. The Federal Energy Regulatory Commission—which is the first stop for permit applications for these new terminals—has so far been more of a rubber stamp. (Earlier this month, it approved a plan to dramatically increase the flow of fracked gas through one of Venture Global's facilities, and also a big fracked-gas pipeline in the Pacific Northwest.) But, after FERC, the next player is the Department of Energy. It can't deny permits for the facilities, but it can deny the export licenses needed to make them profitable. (Without such a license, companies would be able to sell only to Mexico, Canada, and a handful of other countries with which we have free-trade agreements.) In order to do so, the D.O.E. needs to conclude that the projects would be in "the public interest," which it has been doing, using guidelines

developed under the Trump Administration, on the ground that L.N.G. would do less climate damage. If Howarth's findings are correct, the Administration needs to establish new guidelines.

The industry would naturally resist new guidelines, and Republicans in Congress have moved to strip away the public-interest standard entirely. But the Biden Administration may find new support for such a step in yet another new report, this one from Tyson Slocum, of Public Citizen, which concludes that "the dramatic flood of Liquified Natural Gas (LNG) exports authorized by DOE in recent years is upending domestic energy markets, directly contributing to punishingly high energy prices for Americans, thereby exacerbating energy poverty and income inequality for the most vulnerable in our communities." Using new government data, Slocum estimates that the costs to American consumers would top fourteen billion dollars by 2050.

It remains to be seen whether Howarth's findings and other recent reports, not to mention 2023's record temperatures, might lead the Biden Administration to stop new approvals for more plants until it can redefine the "public interest." Its actions, in the weeks ahead, could begin to repair some of the political rift opened by the President's approval of the Willow oil complex earlier this year, or they could deepen the sense of many young people that we remain on a glide path to yet more catastrophic warming. ♦

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