

Q&A: Gassy cows, leaking wells and other adventures in measuring methane

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Last week, a landmark climate report from the United Nations gave the sobering consensus of decades of international climate change research: "It is unequivocal that human influence has warmed the atmosphere,

ocean and land," causing "widespread and rapid changes" in the air, seas, once-frozen places and plant and animal life that have touched every region on Earth.

Worse changes could be limited by deep, swift and lasting reductions in [greenhouse gas emissions](#), but it could take 20 or 30 years for [global temperatures](#) to stabilize after that, the report said. Some changes to the oceans, ice sheets and sea level will be irreversible for hundreds or thousands of years.

One new focus of the report from the Intergovernmental Panel on Climate Change is potent greenhouses gasses that last decades or less in the atmosphere—especially [methane](#)—because cutting those is a leading strategy for slowing warming relatively quickly. Amy Townsend-Small, an associate professor of environmental science at the University of Cincinnati, has been studying the second-most abundant greenhouse gas emitted through human activities for over a decade.

This interview has been edited for space and clarity.

Q. The new Intergovernmental Panel on Climate Change assessment is clear carbon dioxide is the primary driver of human-caused climate change and curbing carbon dioxide will be the primary solution. But it also says "strong, rapid and sustained reductions" in methane emissions are important. Why is that?

A. Methane has a high global warming potential, which means it's better at trapping heat than CO₂. It's not as abundant in the atmosphere as CO₂, and emissions are much lower than CO₂, so that's why CO₂ is the biggest problem. Burning fossil fuels emits CO₂, and burning fossil fuels is by far the biggest problem. But CO₂ emissions have been steady for the last few decades, and CO₂ concentrations are growing at a very predictable rate. Methane concentrations have been going up faster and

faster lately, and because methane has a higher global warming potential, it's causing rapid climate warming. What's happening now is the scary stuff, like rapidly increased sea level rise, an increased amount of fires, increased hurricane intensity, destabilization of ice.

Q. Why did you decide to focus on methane?

A. I first started working on it about 15 years ago. I had a job in California, and the governor at the time, Arnold Schwarzenegger, passed a law limiting greenhouse gas emissions, including methane and another powerful greenhouse gas, nitrous oxide. But at the time, the state didn't really know what the sources were, and I worked on constraining the sources of methane and nitrous oxide in the state. I was the first researcher to find methane emissions from oil and gas systems were higher than what the state budget thought. That was just as Pennsylvania was becoming one of the largest natural gas fields in the world, and that created this new international research area on methane leaks from natural gas systems.

Q. What kind of changes would make the "strong, rapid and sustained reductions" in methane emissions we need?

A. Limiting additional development of natural gas and creating policies around methane emissions from natural gas systems, especially production; reducing meat and dairy consumption; regulations on methane emissions from landfills—they can leak methane just like [oil wells](#), but they're also a potential renewable natural gas source.

Another thing I think is really needed is more research funding for methane. Our government doesn't really fund it. A lot of the research in my group has been funded sort of patchwork. There still isn't a lot of scientific agreement on why methane concentrations are rising. No one's really sure, and there are tools that we could use to study it. There could

be an international scientific effort to figure it out, which would make solving the problem easier.

Jordan Fischbach, director of planning and policy research at the Water Institute of the Gulf, sits in at Wightman Park in Squirrel Hill on July 30. The park and the neighborhood around it have been modified to send rainwater to Wightman Park to be returned to groundwater instead of into the sewers.

Q. What are some of the odder places you have gone or methods you have used to measure methane?

A. A lot of cows, putting tubing into a cow's mouth. Luckily, most of the methane comes out of their mouths. They're cuter that way. A lot of abandoned wells and active wells in Appalachia, Texas, Colorado, all over the U.S.; a lot of off-the-grid navigating with the GPS; trying to get downwind of a landfill so I can sample it. We use these stainless steel canisters to measure methane. In cities, they attract a lot of attention. They're round, and they have a little stem on the top. They kind of look like a bomb. People will pull over and be like, 'Um, what are you doing?' 'Oh, just a project.' Usually, the conversations go pretty well.

Q: If you see something, say something.

A. Exactly. Wastewater treatment plants are another source. Those are pretty gross. Methane's pretty disgusting.

Q. You've also worked on some of the feedback loops that could happen where methane is emitted as the climate warms. Has that taken you to other far-flung places?

A. Yes, the Arctic, Alaska. That's another issue. Natural sources of methane that are emitted as the earth gets hotter and wetter are

potentially increasing a lot, as well, either from permafrost soils or wetlands in the tropics, like the Amazon, or lakes and reservoirs. So my students and I have done measurements on lakes and the Great Lakes, too.

Q. One reason for focusing on methane seems to be to point out there can be a pretty significant short-term, noticeable payoff to making some societal change.

That's what we've been saying.

I will say, though, plugging abandoned wells is not going to do it. They're a very minor contributor to methane emissions. Active wells are the main source of energy-related [methane emissions](#).

In Pennsylvania and Ohio, low-producing wells are venting natural gas, some of them. They're a big potential source. (Governments) could go a long way by creating a plugging program for marginal or low-producing wells.

Q. Are you gratified to see this attention paid to what has long been known as the second-biggest contributor but has become a larger part of the conversation recently?

A. Yeah. I hope policies will follow.

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