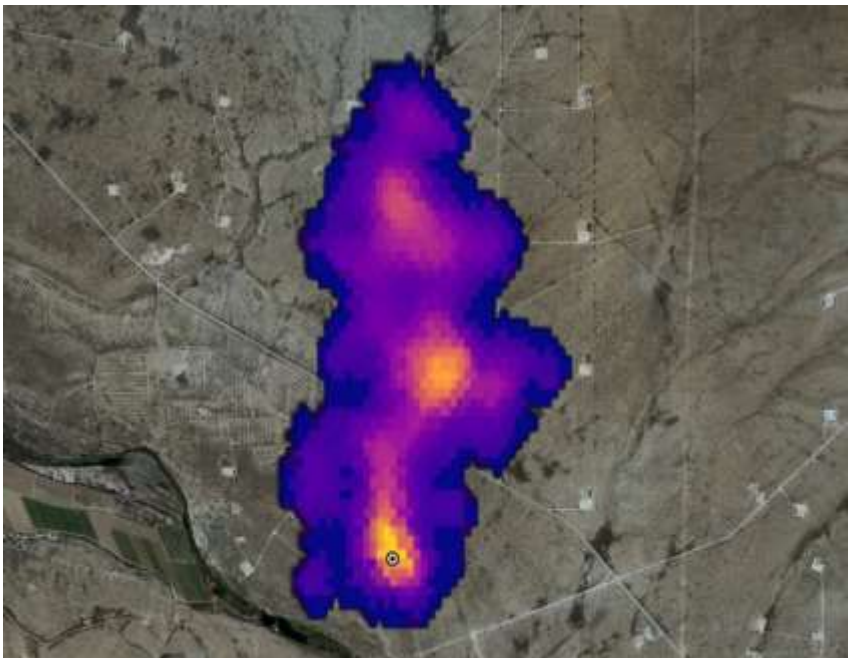
Cover Me — With Methane Emissions, Solutions Can Be As Tricky to Pin Down as the Problem Itself

Multi-Faceted Approach Includes Regulations, New Fee, Third-Party Help



- **Difficulty in identifying and quantifying methane emissions makes it more challenging to establish a regulatory framework.**
- **The IRA's Methane Emissions Reduction Program features the first U.S. fee for the emissions of any greenhouse gas.**
- **EPA's supplemental proposal taps third parties to play a much bigger role as part of Super-Emitters Response Program.**
- **Low-performing wells are more likely to leak, but not all wells are the same and not all emissions controls will work on every well.**

1. Introduction

It's widely believed that methane is a significant greenhouse gas (GHG) and that reducing methane emissions from oil and gas production will be critical to hitting long-term emission targets, but that's about where most of the common ground ends. There are serious disagreements about the actual magnitude of methane emissions, the proper role of government regulation, and whether requirements to control those emissions would place an undue burden on the energy industry and lead to decreased supply.

Methane is the primary constituent in pipeline natural gas but also a super-potent, front-end-loaded GHG, with a Global Warming Potential (GWP) often estimated to be more than 80 times that of carbon dioxide (CO_2) during the initial 20-year period after it's emitted into the atmosphere and more than 25 times that of CO_2 over a 100-year period. That means making even modest reductions in methane emissions can really help blunt the long-term effects of man-made climate change.

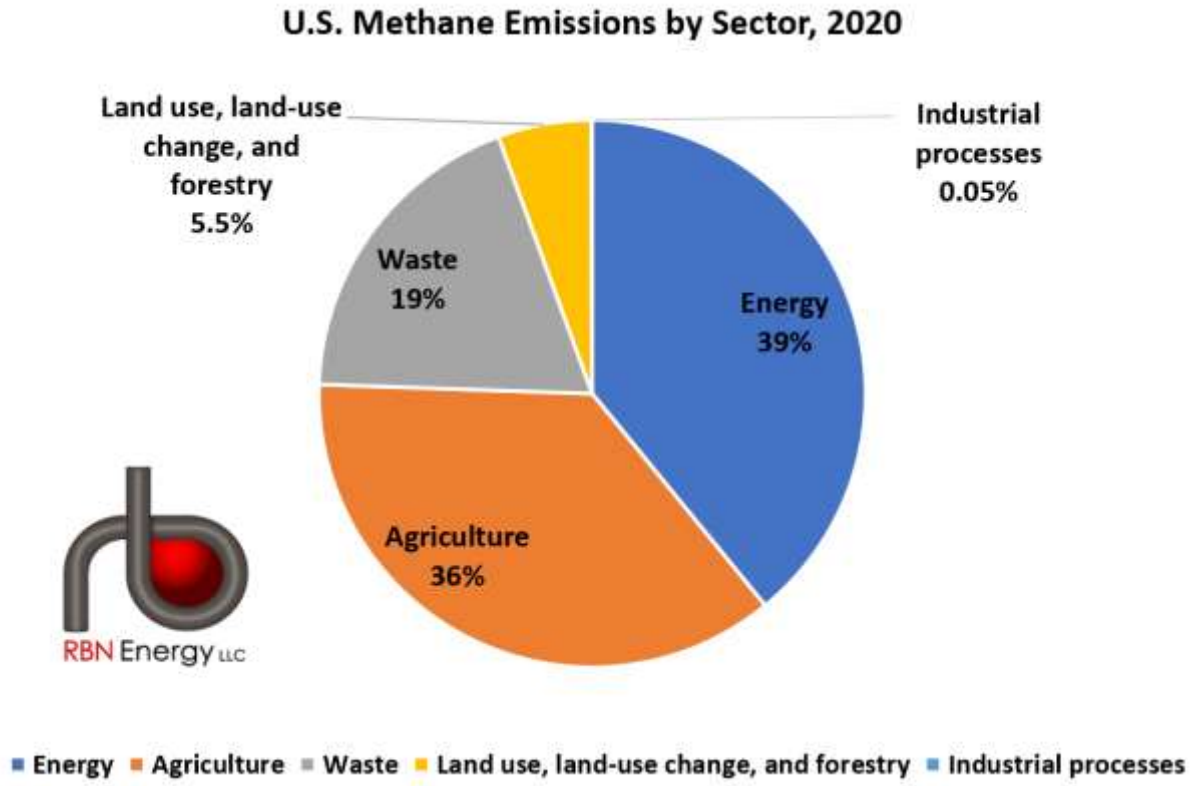


Figure 1. U.S. Methane Emissions by Sector, 2020. Source: EPA

In 2020, according to the most recent data in the Environmental Protection Agency (EPA)'s Greenhouse Gas Inventory Data Explorer, U.S. methane emissions from energy production and use totaled the equivalent of 269 million metric tons (MT) of CO_2 (based on the 100-year timeframe noted above). As shown in Figure 1, that made the energy industry the biggest source (39%; blue slice) of methane emissions in the U.S. in 2020, topping agriculture (36%; orange slice), waste (19%; gray slice), changes in land use (5.5%; yellow slice), and industrial processes (0.05%).

As significant as the EPA's estimates of methane emissions might be, some recent studies have indicated that the real-world numbers could differ significantly because of the way the EPA calculates its estimates. The EPA's Greenhouse Gas Inventory (GHGI), which is published annually, utilizes what is called a "bottom-up" approach to estimate those emissions. It uses estimated emissions factors for certain activities, assuming normal performance, such as well completions or the performance of valves or seals, then multiplies that by the assumed amount of activity in each category to create an overall emissions estimate. This approach is important in identifying the most significant contributors of emissions but can also miss those that are temporary or episodic — and overlook or underestimate others.

A "top-down" analysis can lead to different conclusions. In that approach, emissions are assessed based in part on a variety of observations, such as by aircraft, satellites, weather stations and other tools for direct measurement — all of which can be hampered by false detections, low-resolution measurements and limited capabilities. While this approach is considered more likely to account for emissions that might otherwise be missed in a bottom-up analysis, it can be difficult to assign emissions to a specific source, so emissions from unrelated sources may be lumped in, and samples might not be representative of the entire area of study. It's also important to note that a top-down analysis does not yield quantitative data, and the point-in-time estimates noted above cannot be correlated with mass emissions over time.

Just as there is little agreement on the actual level of emissions, there are disputes about what government and industry should do about them. In this report we will discuss four main themes:

Complex problems often require a combination of strategies. That's the case with methane emissions, where there is little common ground among industry, the government and the public about what steps should be taken next. Section 2 of this report looks at the wide variety of approaches the U.S. and other countries are taking to regulate methane emissions.

The Inflation Reduction Act (IRA) offers a lot of incentives — mostly in the way of tax credits — to advance the Biden administration's clean-energy initiatives and reduce GHG emissions, but very few penalties. As detailed in Section 3, one notable exception is the law's Methane Emissions Reduction Program (MERP), which features the federal government's first-ever fee on the emissions of any GHG.

The Biden administration made its first foray into reducing methane emissions from oil and gas operations with a proposal submitted in November 2021, but additional plans were already in the works. The EPA followed up with a supplemental proposal in November 2022 that significantly broadened the initial plan. Section 4 examines the EPA's supplemental proposal, its targeting of so-called "super-emitters," and why third-party groups will play a bigger role in mitigating methane emissions in the years ahead.

Those super-emitting events often come from low-performing oil and gas wells, which make up a significant majority of wells in operation. As outlined in Section 5, since well sites have the potential to operate for decades, older sites are widely considered to have a greater risk of significant methane leaks over time. But it's important to note that not all wells are the same and the behavior of individual wells can vary greatly.

However effective these measures turn out to be, finding the best way to deal with methane emissions is going to be an important topic in the years to come. Each approach contributes to climate goals in a different way, and each has its own set of drawbacks and benefits.

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