PermianMAP
FREQUENTLY ASKED QUESTIONS

Is EDF reporting observed leaks to the proper authorities?

Any leak or emissions event that presents an imminent safety hazard – such as a potential risk for explosion – is immediately reported to the relevant state or local authorities.

Regulators have been briefed on the project’s methodology and given overviews of the findings to date. Emission data will be available to regulators at PermianMAP.org on an ongoing basis and EDF is available to answer questions at any time.

Additionally, we have shared data with relevant operators in our study area in advance of publishing the data online and will do so on a regular basis as new data is processed.

How was the estimated leak rate calculated?

The leak rate estimate is derived from aerial measurements taken on a Scientific Aviation research flight. An aircraft equipped with a Picarro CRDS methane analyzer was flown around the target area to measure the difference between upwind and downwind methane concentrations. Researchers at Penn State analyzed the flight data with two approaches to estimate regional emissions: the mass balance approach and atmospheric transport modeling, both of which resulted in the same estimate.

To calculate a methane leak rate for the study area we divided the area’s methane emissions by the aggregate average methane production reported within the same area (aggregate average gas production converted to a methane production value based on assumption of 80% methane content and 19.2 kg CH₄/Mcf). Emissions normalized to gas production is a common industry metric for assessing environmental performance.

We assume that all detected methane emissions are due to oil and gas sources. Although other sources such as livestock and landfills may contribute some emissions, existing data sources such as the EPA gridded emission inventory indicate these other sources are negligible in the study area.

How are the aerial and ground survey locations determined?

Our measurements come from a 10,000 square kilometer grid that spans the Delaware Basin, a subsection of the broader Permian Region. This high-producing area contains only 10% of the region’s active wells but produces approximately 40% of its gas and 30% of its oil.

Researchers conducting the surveys used a stratified random sampling approach to select sites and measurement areas within the study area. For more information about our approach, see our methodology page.
How frequently are measurements being taken?
Towers are collecting concentration data continuously, but will deliver analyzed data on regional emissions on a quarterly basis; ground surveys, lasting a total of approximately three to four weeks, will take place at least twice during the duration of the study; and aerial measurements will occur approximately biweekly.

Measurement frequency and field activities could be impacted by COVID-19 and related restrictions on travel and normal operations.

Do emissions measurements represent emissions over time?
Aerial and ground survey measurements are a temporal snapshot of emissions, and do not necessarily indicate that a given measured emission event is continuous. However, these measurements do indicate the current state of Permian emissions – namely, that they are occurring at nearly three times the rate suggested by EPA emissions inventories and that enough gas is being wasted to meeting the annual needs of every home in Houston and Dallas, combined.

Additionally, the random sampling approach is designed to measure sites without bias towards low or high emitters, meaning that any intermittent emissions are measured at about the same frequency as they occur in the study population. As we collect additional data through new surveys and methods (i.e. fixed monitoring towers), we will be able to assess how basin-level emissions change over time.

How did you source wellsite and facility locations, as well as production data?
The project's analyses and spatial presentation includes data on wells and midstream facilities from the Texas Railroad Commission and New Mexico Oil Conservation Division (well locations and some additional well attributes); Enverus (operator name, well type, production status, average daily production); satellite imagery analysis by Descartes Labs (tank battery locations); and EPA's Greenhouse Gas Reporting Program (processing plant locations).

What should companies do regularly to prevent methane emissions?
There are many cost-effective and proven solutions for keeping methane in the system and out of the atmosphere. Fixes are often as easy as tightening loose valves and repairing leaky equipment. Other times, sites may need changes to engineering design to prevent recurring, intermittent issues such as emergency venting.

The first step to prevent methane emissions is improving the quality of methane emissions data. Traditional estimates based on emission factors have been found to significantly underestimate actual methane emissions, so taking actual on-site measurements with tools like a FLIR camera to detect and measure methane emissions is critical for effective mitigation and management. Additionally, ongoing leak detection and repair (LDAR) programs that integrate on-site measurements are among the most effective strategies to consider. Critically, companies should not just address active leaks but also consider the root causes of emissions to identify and address potential sources of high emissions in the future (e.g. replacing high-bleed gas-pneumatic devices with low/no-bleed devices).

Some of the detected methane emissions may be due to activities permitted by regulatory agencies, such as uncontrolled tank venting. Although these emissions are legally permitted, they still harm the climate and should be mitigated. There are many options for companies to reduce vented emissions, such as electrifying sites or capturing vented gas for fuel use.
Ultimately, one of the most effective solutions to minimize methane emissions is strong, comprehensive regulation. Companies can join community members and environmental advocates in advocating for effective methane regulation for new and existing sources.

To learn more about methane mitigation options, here are additional resources on emission reduction, best practices, credible methane measurement and quantification approaches, digital methane solutions, and establishing robust methane targets. For further questions or to learn more about measurement and mitigation options, please reach out to EDF at PermianMAP@edf.org.

**How can companies show an emissions event has been inspected and addressed?**

Operators may submit a form via the PermianMAP website to indicate how they responded to the emission event data. In this form, they can indicate how they inspected their site, what they found, what repairs or corrective actions were made, and when they plan to return for a follow-up inspection.

As some emissions are intermittent, or may be coming from a neighboring well or other infrastructure in the area, operators can report if they were not able to find the emission source during their inspection.

**What should government agencies do about Permian methane emissions?**

Methane emissions represent an avoidable climate and waste problem for companies, and meeting this challenge will be key to industry’s viability in a low-carbon economy. That’s why regulators and operators can’t sidestep their obligation to address it, even as they’re coping with extreme market volatility.

We don’t want the methane problem to get worse because states and business leaders lack critical data as their focus is trained on current public health and economic challenges. With the Trump administration working to eliminate federal oil and gas methane rules, states are the frontline. Over the long run, how they address the issue will impact the industry’s future prospects.

Strong, comprehensive state regulatory regimes, like those Colorado has implemented and New Mexico is developing, are needed to reduce methane emissions. EDF has laid out what leading standards look like.

**Is methane pollution a harm to public health?**

Methane is not harmful to humans, but associated gases like cancer-causing benzene released with methane during oil and gas production are. Toxic co-pollutants include toluene and volatile organic compounds, which can harm respiratory health. VOCs also contribute to ground-level ozone and smog, and in turn can aggravate asthma and other lung diseases.

**What would a decline in production mean for Permian methane emissions?**

There is not a one-to-one relationship between declining production and methane emissions. While carbon dioxide emissions will likely decline because of the economic slowdown, the International Energy Agency has expressed concerns that an uptick in oil and gas methane emissions could be possible even as production falls.

The reason for this is that as companies and regulators scale back on both staffing and oversight, leaks could go undetected and unrepaired. PermianMAP data will examine the relationship between production and emissions using field data collected before and during the course of the present downturn.