

# Hidden Menace: Massive methane leaks speed up climate change

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A flare burns off methane and other hydrocarbons as oil pumpjacks operate in the Permian Basin in Midland, Texas, Tuesday, Oct. 12, 2021. Massive amounts of methane are venting into the atmosphere from oil and gas operations across the Permian Basin, new aerial surveys show. The emission endanger U.S. targets for curbing climate change. Credit: AP Photo/David Goldman

To the naked eye, the Mako Compressor Station outside the dusty West Texas crossroads of Lenorah appears unremarkable, similar to tens of thousands of oil and gas operations scattered throughout the oil-rich Permian Basin.

What's not visible through the chain-link fence is the plume of invisible gas, primarily methane, billowing from the gleaming white storage tanks up into the cloudless blue sky.

The Mako station, owned by a subsidiary of West Texas Gas Inc., was observed releasing an estimated 870 kilograms of methane—an extraordinarily potent greenhouse gas—into the atmosphere each hour. That's the equivalent impact on the climate of burning seven tanker trucks full of gasoline every day.

But Mako's outsized emissions aren't illegal, or even regulated. And it was only one of 533 methane "super emitters" detected during a 2021 aerial survey of the Permian conducted by [Carbon Mapper](#), a partnership of university researchers and NASA's Jet Propulsion Laboratory.

The group documented massive amounts of methane venting into the atmosphere from oil and gas operations across the Permian, a 250-mile-wide bone-dry expanse along the Texas-New Mexico border that a billion years ago was the bottom of a shallow sea. Hundreds of those sites were seen spewing the gas over and over again. Ongoing leaks, gushers, going unfixed.



Patches of land housing oil pumpjacks dot the landscape of the Permian Basin in Midland, Texas, Monday, Oct. 11, 2021. Carbon Mapper, a partnership of university researchers and NASA's Jet Propulsion Laboratory, documented massive amounts of methane venting into the atmosphere from oil and gas operations across the Permian, a 250-mile-wide bone-dry expanse along the Texas-New Mexico border that a billion years ago was the bottom of a shallow sea. Credit: AP Photo/David Goldman

"We see the same sites active from year to year. It's not just month to month or season to season," said Riley Duren, a research scientist at the University of Arizona who leads Carbon Mapper.

Carbon Mapper identified the spewing sites only by their GPS coordinates. The Associated Press took the coordinates of the 533 "super-

emitting" sites and cross-referenced them with state drilling permits, air quality permits, pipeline maps, land records and other public documents to piece together the corporations most likely responsible.

Just 10 companies owned at least 164 of those sites, according to an AP analysis of Carbon Mapper's data. West Texas Gas owned 11.

The methane released by these companies will be disrupting the climate for decades, contributing to more heat waves, hurricanes, wildfires and floods. There's now nearly three times as much methane in the air than there was before industrial times. The year 2021 saw the worst single increase ever.

Methane's earth-warming power is some 83 times stronger over 20 years than the carbon dioxide that comes from car tailpipes and power plant smokestacks. Congress and the Environmental Protection Agency have largely failed to regulate the invisible gas. That leaves it up to oil and gas producers—in some cases the very companies who have been fighting regulations—to cut methane emissions on their own.



A lone plant grows from the dry soil next to a flare burning off methane and other hydrocarbons in the Permian Basin in Pecos, Texas, Wednesday, Oct. 13, 2021. The accumulation of carbon dioxide and methane in the blanket of gases encircling the Earth is holding more heat in. And there is now nearly three times as much methane in the air than there was before industrial times. The year 2021 saw the worst single increase ever. Credit: AP Photo/David Goldman

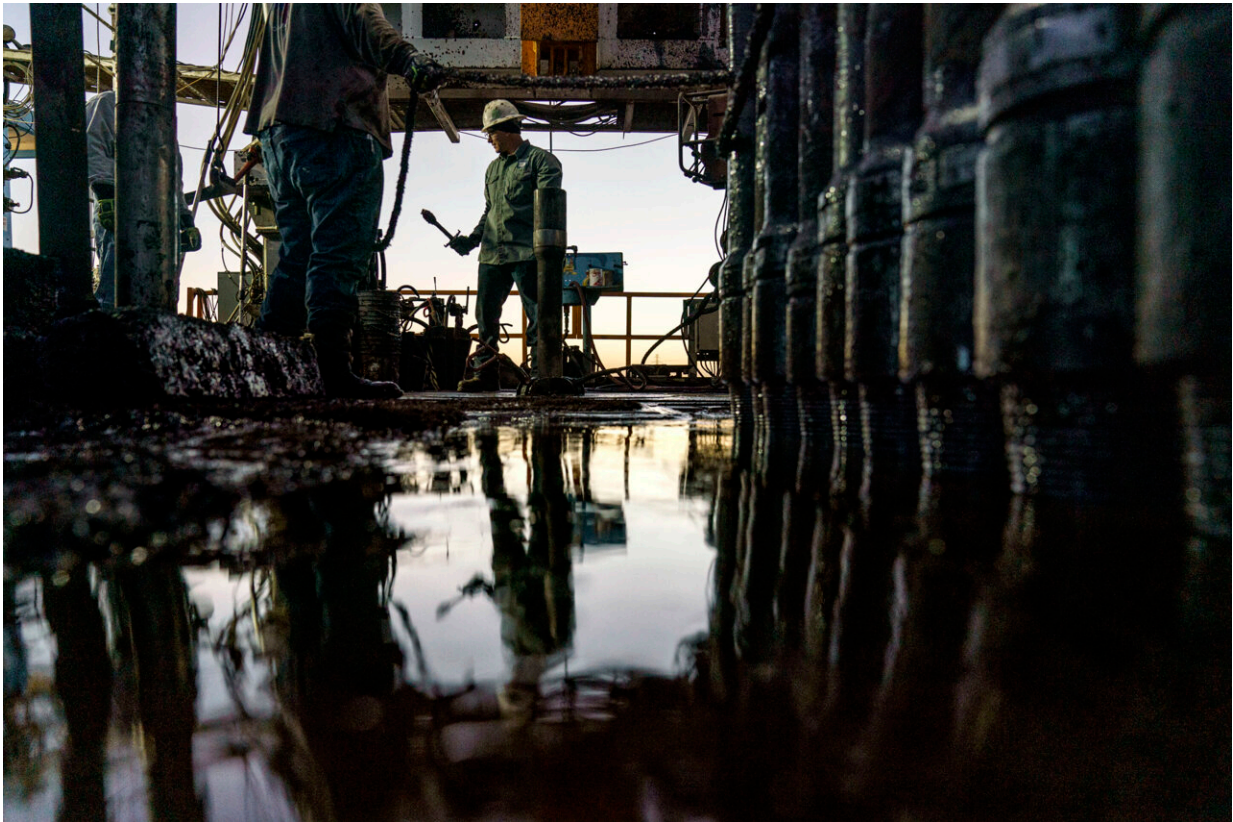
"Methane is a super pollutant," said Kassie Siegel, director of the Climate Law Institute at the Center for Biological Diversity, an environmental group. "If carbon dioxide is the fossil-fuel broiler of our heating planet, methane is a blowtorch."

**PERSISTENT, NOT JUST INTERMITTENT EMISSIONS**

Methane emissions are notoriously hard to track because they are intermittent. An old well may be wafting methane one day, but not the next.

But last October, AP journalists visited more than two dozen sites flagged as persistent methane super emitters by Carbon Mapper with a FLIR infrared camera and recorded video of large plumes of hydrocarbon gas containing methane escaping from pipeline compressors, tank batteries, flare stacks and other production infrastructure. The Carbon Mapper data and the AP's camera work show many of the worst emitters are steadily charging the Earth's atmosphere with this extra gas.

In addition to West Texas Gas's Mako site, AP observed a large plume of gas escaping from tanks at a WTG compressor station about 15 miles away in the Sale Ranch oil field. Carbon Mapper estimated that emissions from that site averaged about 410 kilos of methane an hour.



Forehand Kory Mercantel works on Latshaw drilling rig #43 in the Permian Basin in Odessa, Texas, Wednesday, Oct. 13, 2021. The Permian is the top oil and gas producing region in the United States. On any given day, about 500 rigs are drilling new wells within the basin to boost production. Credit: AP Photo/David Goldman

AP found Targa Resources, a Houston-based natural gas storage, processing and distribution company, was the closest operator to 30 sites that were emitting a combined 3,000 kilograms of methane per hour, with plumes escaping from pipelines, wells, tanks and compressor stations across the company's sprawling Texas footprint.

Targa did not respond to a detailed list of questions from the AP.

Another 21 super-emitting sources were detected at facilities owned by Navitas Midstream, a pipeline company based north of Houston, that has since been sold to Enterprise Products Partners. Equipment belonging to Navitas was estimated to be releasing a combined 3,525 kilos of methane an hour.

## WASTING A MARKETABLE PRODUCT

One of the unusual things about this kind of climate pollution is that operators are wasting the very product they are working to extract. Methane gas is not a waste product; it is the target gas that operators drill for, process and sell all over the world.



The Texas state flag flies above workers at Latshaw oil drilling rig #43 in the Permian Basin in Odessa, Texas, Wednesday, Oct. 13, 2021. More than 5,000



new well-drilling permits were issued in the Texas portion of the Permian in 2021, as demand for fossil fuels rebounded after a COVID-era slump in demand. Numbers from the first quarter of 2022 show the industry on pace to eclipse that figure. Credit: AP Photo/David Goldman

But fracking has unlocked such massive amounts of natural gas from the Permian's shale deposits that the basin's ever-expanding web of pipelines don't have enough capacity to gather and transport it all. As a result, natural gas is still routinely burned off even as billions have been invested into new terminals along the Gulf Coast to ship the glut of American gas to overseas markets.

Still, companies say they're doing better.

Houston-based Enterprise Products, which owns the former Navitas assets, said it was cracking down. "We are in the process of integrating the acquired assets and are committed to ensuring they are operated safely and responsibly," said spokesman Rick Rainey.

He did not answer specific questions about what the company would do to reduce methane emissions.

In a statement, Midland-based West Texas Gas said it routinely conducts its own overflights with gas detection equipment and within the last six months had either "repaired or upgraded" nine of the super emitting sites that AP asked about, including Mako. The company was "actively addressing" another site, though it declined to provide specifics about what improvements were made and when. WTG said it inspected the last site and found no leak.



Motorman Danny Perez, right, and forehand Kory Mercantel, work on Latshaw oil drilling rig #43 in Odessa, Texas, Wednesday, Oct. 13, 2021. Most rigs run day and night, with crews of roughnecks rotating in 12-hour shifts. Credit: AP Photo/David Goldman

"West Texas Gas is deeply committed to environmental stewardship and continuously strengthens company processes and procedures to ensure we operate in a manner that is consistent with that commitment," the statement said.

## YEARS OF INACTION

In May 2016, President Barack Obama announced a Climate Action Plan that included new federal rules requiring the oil and gas sector to

slash methane emissions by 40% by 2025.

But President Donald Trump, who derided climate change as a Chinese-perpetrated hoax, scrapped those policies before they took effect.

Trump's climate denial and die-hard support for fossil fuels attracted campaign contributions from the industry. It also won him widespread support in the Permian's Republican-dominated cities and towns, where pumping oil and gas is considered both lifeblood and birthright.



Well site supervisor Jason Brown looks out toward the Permian Basin from the control room of Latshaw oil drilling rig #43 in Odessa, Texas, Wednesday, Oct. 13, 2021. The constant need for skilled workers drives blue-collar incomes that can easily reach six figures a year, supporting spouses and children who often live hundreds of miles away. Credit: AP Photo/David Goldman

At Big John's Feedlot, a burger and barbecue hut in Big Spring, the parking lot one day last fall was filled at lunchtime with gas-guzzling American-made pickup trucks. Inside, multiple portraits of John Wayne and a mounted deer wearing a cowboy hat preside over diners eating sauce-slathered beef ribs and krack poppers, a house specialty of cream cheese stuffed peppers wrapped in bacon.

"Can you imagine anyone in here driving an electric car?" asked Brenda Stansel, the owner, who insisted Trump was still the rightful commander in chief. Asked if she believed in climate change, Stansel responded: "I believe in God."

On the first day of his administration, President Joe Biden ordered EPA to write new rules to reduce the oil and gas industry's methane emissions, and Congress reinstated some Obama-era restrictions on methane from new oil and gas facilities. Proposed rules to address emissions from the hundreds of thousands of existing sites are still under review.

Tomás Carbonell, EPA's deputy assistant administrator for stationary sources, told AP that reducing methane emissions is urgent.

"Reducing air emissions from the oil and natural gas sector is a top priority for the administration and for EPA," Carbonell said. Methane, he added, is "helping drive impacts that communities across the country are already seeing every day, including heat waves and wildfires and sea level rise."



Pipes sit in a cotton field waiting to be installed for new oil pipelines in Lenorah, Texas, Friday, Oct. 15, 2021. The frenetic search for more gas and oil is happening just as President Biden and world leaders are promising to cut methane emissions across the world. Credit: AP Photo/David Goldman

## AN UNKNOWN QUANTITY

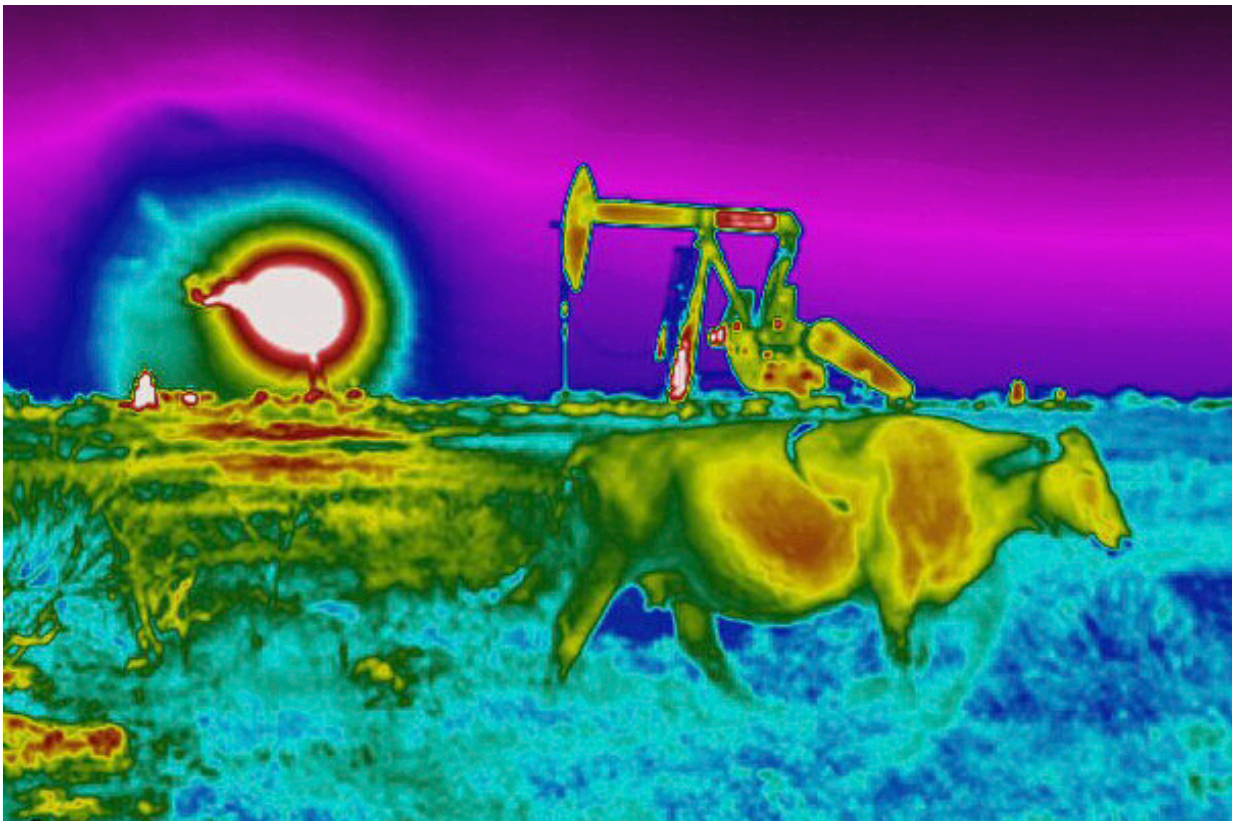
To track the problem, the U.S. government keeps an inventory of methane released into the atmosphere. Those figures are used by policy makers and scientists to help calculate how much the planet will warm in the coming decades.

But AP found the government database often fails to account for the true rate of emissions observed in the Permian.

The EPA requires companies to report to its [Greenhouse Gas Reporting Program](#) emissions above the equivalent of 25,000 tons of carbon dioxide per year. Only a few dozen sites in the Permian say they exceed that threshold for methane.

AP's analysis, however, found that more than 140 of the super-emitting facilities identified by Carbon Mapper were on track to exceed the reporting limit.

For example, Carbon Mapper estimated that Mako emitted an average 870 kilos of methane per hour over each of the four times it was measured. Over the course of a year, that would be 7.6 times the federal reporting threshold.



In this photo made with an Optical Gas Imaging thermal camera, a plume of heat from a flare burning off methane and other hydrocarbons is detected in the background next to an oil pumpjack as a cow walks through a field in the Permian Basin in Jal, N.M., Thursday, Oct. 14, 2021. Credit: AP Photo/David Goldman

In 2020, the most recent year that data is available, the West Texas Gas subsidiary that operates Mako reported that methane emissions from all of its boosting and gathering operations combined were just one-twelfth of what Carbon Mapper documented billowing from the Mako site alone.

Other companies also reported methane emissions at levels far lower than what Carbon Mapper's aircraft observed, even when adjusted to take into account overflights where no emissions were recorded.

Devon Energy reported releasing methane equivalent to 42,000 metric tons of CO<sub>2</sub> for a year of operations in the Permian Basin. AP's analysis, using the detected emissions, shows they would likely emit that much in just 46 days.

If Lucid Energy Group's observed emissions continued unabated, the company would surpass what it reported to EPA in just three months.

A spokesperson for Devon said the company is committed to reducing its methane emissions and being transparent about its progress. The company has joined a U.N. partnership for oil and gas companies to report methane.



A cow walks through a field as an oil pumpjack and a flare burning off methane and other hydrocarbons stand in the background in the Permian Basin in Jal, N.M., Thursday, Oct. 14, 2021. Credit: AP Photo/David Goldman

In a statement to AP, Lucid said it had a "best-in-class" leak detection program and that any emissions at its plants "are typically non-methane." The company also questioned the science behind how Carbon Mapper measured its methane emissions rates, claiming "no camera image can provide an accurate concentration of a pollutant."

The [NASA AVIRIS](#) instrument used by Carbon Mapper is not a camera. It is an airborne infrared spectrometer that measures wavelengths in light to detect and quantify the unique chemical fingerprint of methane in the atmosphere. The instrument then measures the mass of the methane in



the air and the length of the plume. Carbon Mapper takes into account the wind speed at the site to estimate the hourly emissions rate, averaged over multiple overflights.

This estimation method is well established and common practice with emissions monitoring systems, Duren said, and has been used in multiple prior peer-reviewed studies.

Vaquero Permian Gathering reported emitting methane equivalent to 19,000 metric tons of CO<sub>2</sub> for the company as a whole, yet AP found just a single Vaquero site was spewing methane at a rate of 53,000 tons per year.

A spokesperson for Vaquero said the company did not have any comment.



A crop dusting plane flies over a field next to an oil well in the Permian Basin in Lenorah, Texas, Friday, Oct. 15, 2021. Methane emissions are notoriously hard to track because they are intermittent. An old well may be wafting methane one day, but not the next. Credit: AP Photo/David Goldman

Though the Clean Air Act requires companies to accurately report greenhouse gas emissions, the EPA could not provide AP with a single example of a polluter being fined or cited for failing to report, or underreporting.

## TEXAS' NON-ENFORCEMENT

If the federal government is behind the curve on how much methane emissions have escalated with the fracking boom, Texas is even more hands off.

Tim Doty retired from the Texas Commission on Environmental Quality in 2018 because, he said, the agency's leadership had little interest in monitoring, documenting or addressing airborne emissions, not even the toxic chemicals such as hydrogen sulfide, sulfur dioxide and benzene that can come from oil and gas operations.

"They don't go look for anything," said Doty, who now works as a private consultant for clients that include environmental groups.



Flares burn off methane and other hydrocarbons at an oil and gas facility in Lenorah, Texas, Friday, Oct. 15, 2021. Massive amounts of methane are venting into the atmosphere from oil and gas operations across the Permian Basin, new aerial surveys show. The emission endanger U.S. targets for curbing climate change. Credit: AP Photo/David Goldman

The Mako site, for example, was built in 2018, and no one from TCEQ has ever visited the site, spokesman Gary Rasp told AP.

Doty, who served as a senior manager for the state's mobile air quality program, said that starting under the administration of then-Texas Gov. Rick Perry in 2000, the agency discouraged staff from enforcing air quality violations against the oil and gas industry.

A champion of the fossil fuels industry, Perry served a record three terms as Texas governor before becoming President Donald Trump's energy secretary. He is now a partner and board member at Energy Transfer, one of the nation's largest oil and gas pipeline companies.

Doty said the Texas environmental agency has cameras capable of detecting air pollutants leaking from oil and gas facilities, but after he and other staff began documenting huge methane plumes about a decade ago they were told to keep the cameras locked away.

"Even though they have 20 infrared cameras, they don't actively take them out in the field," said Doty, who was charged with training staff members to use them. "And the TCEQ still hasn't really recognized methane (as a problem). You can't really openly talk about climate change within that agency."



A resident sits by the pool at the Ocean Front RV Resort in Kermit, Texas, Wednesday, Oct. 13, 2021. The oil and gas boom has led to the creation of "man camps," where workers and sometimes their families live in sprawling tracts of temporary housing in the middle of the desert. Credit: AP Photo/David Goldman

TCEQ's own fiscal year [2021 enforcement report](#) appears to bear out Doty's critiques. Of 5,362 reported "excess emissions events" statewide that year, TCEQ issued no findings in 4,486, or 84% of cases, and asked for corrective action in only 19 cases.

TCEQ has issued upwards of \$10 million in annual fines for violations of air, water or waste standards, but the median fine—less than \$4,000—is pocket change for most oil and gas companies.

Enterprise Products, which acquired the Navitas pipelines underlying more than a dozen methane plumes in AP's analysis, was fined \$46,000 last year for flares and valve malfunctions at its Texas facilities. The company is valued at more than \$50 billion. Targa faced state fines of \$100,000 for carbon monoxide and nitrous oxide emissions. Neither company was cited for emitting methane. Both denied the state's allegations and offset their financial penalties by helping school districts purchase new buses.

Across the border in New Mexico, regulators are taking a much different approach.

New regulations enacted last year by the administration of Democratic Gov. Michelle Lujan Grisham regulates methane not as a greenhouse gas, but as a wasted industrial resource that when released into the

atmosphere deprives the state of tax revenue.



Tristan Yperman, 37, holds her son, Grant, 1, in the makeshift yard outside their RV at the Ocean Front RV Resort in Kermit, Texas, Oct. 13, 2021. Yperman's husband is an engineer with a construction contractor widening the highway into Kermit, a sleepy desert crossroads that has seen its population grow with the oil boom. They have been living in their RV they've named Freya for about a year and move around as his job dictates. Spots in the 291 space RV park go for \$780 a month, \$1,200 for a small one-room cabin. "We never really know where we go next," said Yperman who is expecting their second child in March. Credit: AP Photo/David Goldman

The [new rules](#) require producers to report the amount of gas they

produce and track what was lost. Routine flaring and venting are forbidden, and producers have to provide an explanation each time gas is burned off.

## TWO OPPOSITE TRENDS

Even as nations seek to lower their carbon footprints, global demand for natural gas continues to grow. This year alone, U.S. gas shipments to Europe have tripled since the beginning of the war in Ukraine.

On any given day, about 500 rigs are drilling new wells in the Permian basin to boost production. They tower over the landscape, hulking steel goliaths that seem to spring up as spontaneously as desert flowers after a thunderstorm, moving on to somewhere else after a couple weeks.

Most rigs run day and night, with crews of roughnecks rotating in 12-hour shifts. They often sleep on site in nearby "man camps," rows and rows of bunk house trailers where weekly rents for a room are comparable to big city apartments. The constant need for skilled workers drives blue-collar incomes that can easily reach six figures a year, supporting spouses and children who often live hundreds of miles away.



Cowboy hats hang on a deer head next to a portrait of John Wayne at Big John’s Feed Lot in Big Spring, Texas, Friday, Oct. 15, 2021. At the burger and barbecue restaurant the parking lot was filled at lunchtime with gas-guzzling American-made pickup trucks. “Can you imagine anyone in here driving an electric car?” asked Brenda Stansel, the owner, who insisted Trump was still the rightful commander-in-chief. Asked if she believed in climate change, Stansel responded: “I believe in God.” Credit: AP Photo/David Goldman

More than 5,000 new well-drilling permits were issued in the Texas portion of the Permian in 2021. Numbers from the first quarter of 2022 show the industry on pace to eclipse that figure.

Each new well, which takes about two weeks to drill, represents millions in capital investment—corporate bets that demand for oil and gas will



continue for decades to come.

The frenetic search for more gas and oil is happening just as Biden and other world leaders are promising to cut methane emissions across the globe.

Scientists warn that we are in a decisive decade for the Earth's climate, with sharp reductions in greenhouse gas emissions needed immediately to avoid the most catastrophic droughts and superstorms and prevent coastal cities from being swamped by rising seas.

This summer is on pace to be among the hottest on record, with wide swathes of the Earth shattering temperature records and billions of people struggling to cope with weeks-long heat waves. Even in energy-rich Texas, the primary electricity provider had to take emergency conservation measures to keep the state's grid from failing because of soaring demand for air conditioning.



Utility poles line a road through the Permian Basin in Mentone, Texas, Thursday, Oct. 14, 2021. The Permian, a 250-mile-wide bone-dry expanse along the Texas-New Mexico border, was the bottom of a shallow sea a billion years ago. Credit: AP Photo/David Goldman

Biden said last week the Earth is running out of time, calling the climate crisis a "code red for humanity."

"I will do everything in my power to clean our air and water, protect our people's health, to win the clean energy future," the president said. "Our children and grandchildren are counting on us."

At an international climate summit in November, the United States signed on to a Global Methane Pledge to reduce methane emissions by

30% by 2030. More than 100 countries agreed to the target, though Russia and some other major methane emitters refused.

To meet that deadline, the American oil and gas industry would have to reduce emissions at a rate far beyond anything currently seen.

The industry says it is working toward that goal.

"To be able to capture more methane emissions makes sense from a business perspective," said Frank Macchiarola, the senior vice president of policy, economics and regulatory affairs at the American Petroleum Institute, an industry trade group. "It's the product that we ultimately want to bring to market. And it also obviously makes sense from an environmental standpoint."



A sign warns passing motorists that hitchhikers may be escaping inmates in Midland, Texas, Monday, Oct. 11, 2021. Centered around the boomtowns of Midland and Odessa, the Permian Basin is now the top oil and gas producing region in the United States, which in turn is the world's No. 1 producer. Credit: AP Photo/David Goldman



A statue of Jesus stands next to graves in a cemetery beside an oil and gas facility in Pecos, Texas, Thursday, Oct. 14, 2021. Oil was discovered here in 1921, and in the intervening century wildcatters have drilled more than a quarter million wells into the layer cake of shale rock under the desert, many more than a mile deep. Credit: AP Photo/David Goldman



Raylee Bothwell, 8, holds up her Minnie Mouse blanket in the wind while watching her first drive-in movie from the back of her family's pickup truck in Midland, Texas., Tuesday, Oct. 12, 2021. Centered around the boomtowns of Midland and Odessa, the Permian is now the top oil and gas producing region in the United States, which in turn is the world's No. 1 producer. Credit: AP Photo/David Goldman



An oil pumpjack operates under a partial moon in the Permian Basin in Stanton, Texas, Monday, Oct. 11, 2021. Massive amounts of methane are venting into the atmosphere from oil and gas operations across the Permian Basin, new aerial surveys show. The emission endanger U.S. targets for curbing climate change. Credit: AP Photo/David Goldman

But climate scientists and environmentalists warn the industry's incremental efforts are nowhere near enough to avoid dire consequences for humanity.

"Methane is responsible for 25% of today's global warming, and we can't limit future warming to 2 degrees Celsius if we don't drastically cut those emissions," said Ilissa Ocko, a senior climate scientist at the Environmental Defense Fund, a group that campaigns for climate action.

"We have the tools to cut methane in half and the faster we do that, the better off our climate and communities will be."

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