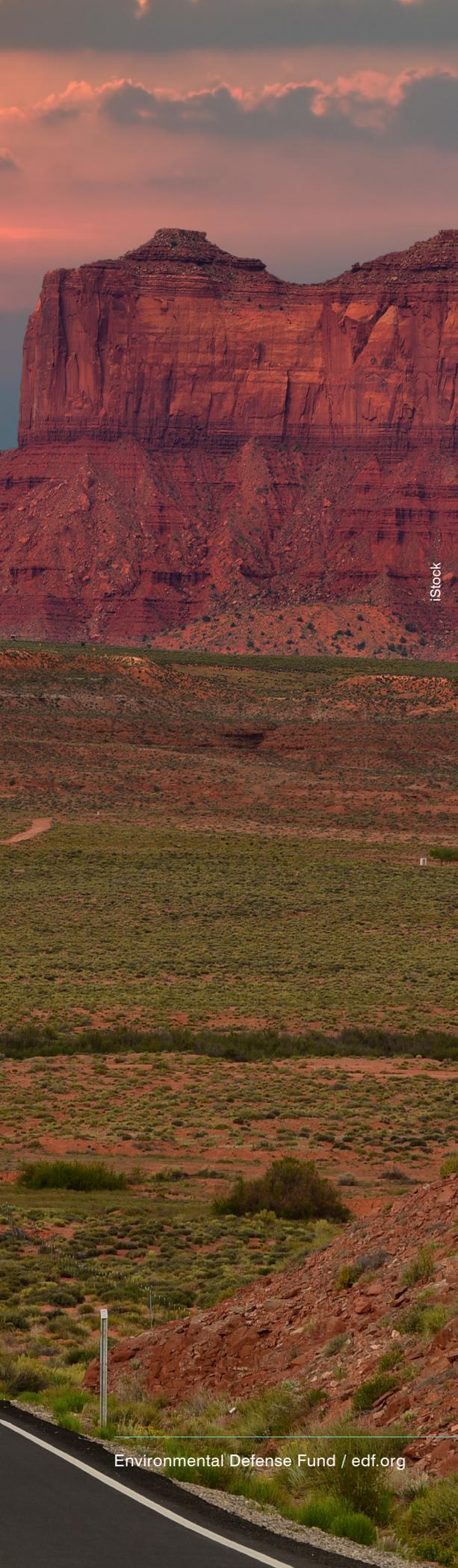
A tall, blue and white oil and gas drilling rig stands in a desert landscape under a clear blue sky. The rig is the central focus, with its derrick extending high into the air. In the foreground, a brown cow stands on a dirt road, looking towards the camera. The background shows a flat, arid landscape with sparse vegetation and a few other pieces of industrial equipment in the distance.

Natural Gas Waste on the Navajo Nation

An analysis of oil and gas methane emissions





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Executive summary

Methane is a potent climate pollutant and the main ingredient in natural gas. Research shows oil and gas companies waste tremendous amounts of natural gas each year due to leaky equipment, deliberate venting, excessive flaring and other practices.

Oil and gas has been produced on Navajo lands since the 1920s. Unfortunately, companies operating are wasting a disproportionate amount of energy compared to their counterparts across the country – resulting in significant economic and environmental consequences for Navajo communities.

This analysis conducted by Environmental Defense Fund concludes companies waste more than a billion cubic feet of natural gas a year — \$3.4 million worth of natural gas that, if captured, could mean as much as an additional \$850,000 a year in royalties to the Navajo Nation and allottees. This volume of wasted gas is more than enough to meet the annual usage needs of every occupied home on the Navajo Nation. The problem also leads to 13,000 tons of methane emissions per year, which is equivalent to 3.8 percent of the total gas produced – an emissions rate 65 percent higher than the national average.

These largely avoidable methane emissions can also lead to forms of pollution with serious health problems for tribal communities. Emissions from oil and gas production also contain toxic, even deadly gases like hydrogen sulfide, toluene, xylene and benzene. Meanwhile, methane leaks allow volatile organic compounds (VOCs) to be released. These VOCs are one of the main building blocks of ozone pollution, which can harm the respiratory system, trigger asthma attacks and worsen emphysema. Ozone levels in New Mexico's San Juan County are close to surpassing federal health standards—putting communities there at risk. The 13,000 tons of methane wasted every year by oil and gas operations on Navajo lands are largely avoidable and equal to the pollution caused by 235,000 automobiles per year.

While the federal government under the Trump administration has been weakening methane waste and pollution standards that apply on tribal lands, the Navajo Nation Environmental Protection Agency itself has the opportunity and authority to require companies to reduce current high pollution and waste levels. Limiting natural gas waste represents a natural continuation of the Navajo Nation's strong record of responsible resource management. The Navajo Nation has the opportunity to reaffirm its sovereignty and its commitment to preserving the health of its people, while protecting its resources and curtailing a potent source of greenhouse gases ■

Oil & gas production on the Navajo Nation

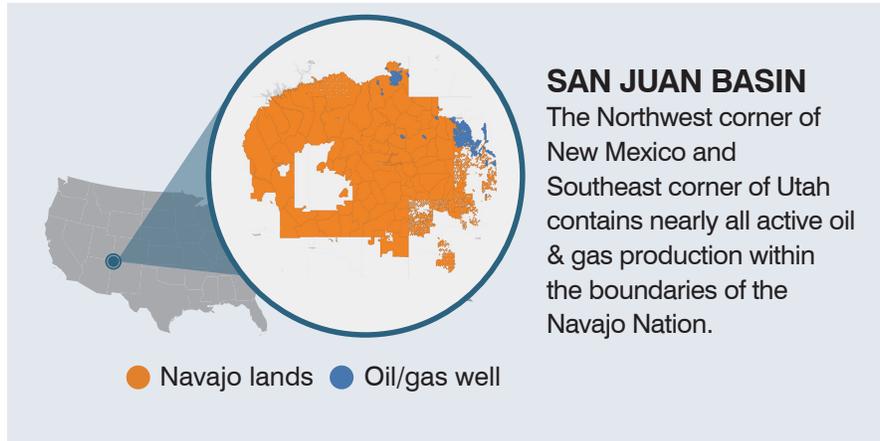
Annual figures and production locations

Total methane emissions
13,000 tons/year

Total natural gas wasted
1,100,000 mcf/year

Value of wasted gas
\$3,400,000/year

Value of lost royalty
\$610,000-\$850,000/year



Emission sources and key takeaways

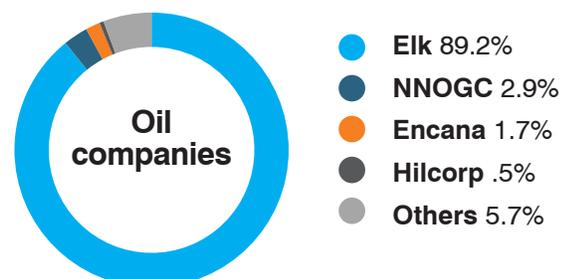
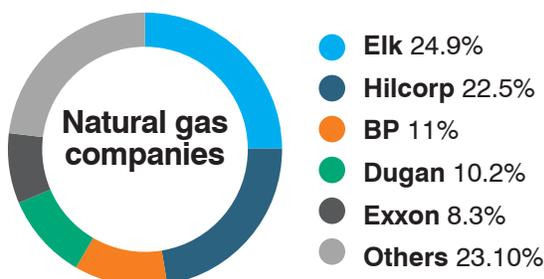
SOURCE	METHANE TONS (2014)	% OF TOTAL
Dehydrators	2800	22%
Pneumatic Controllers	2600	20%
Abnormal Emissions	1700	13%
Gathering Stations	1600	12%
Transmission/Storage	1200	9.2%
Pneumatic Pumps	910	7.1%
Procesing	500	3.9%
Pipelines	430	3.4%
Liquids Unloading	340	2.7%
Well completions	260	2%
Blowdowns	190	1.5%
Other	337	2.63%

Approximately 5.2% of gas produced on Navajo lands is wasted—3.8% is emitted and 1.4% is flared.

Put another way, nearly 1/3 of wasted natural gas on Navajo lands is simply burned away.

Pneumatics, dehydrators and abnormal process conditions are the largest sources of emissions.

Biggest producers



Navajo leaders speak out for efforts to cut natural gas waste



Photo: Laurie Weahkee

“The federal government under the Trump administration has abandoned the role of good steward, and the Navajo Nation must act where it can to protect its resources and its people from unfair exploitation.

“Without federal protections from the Bureau of Land Management’s waste rule or EPA’s methane rule, it’s up to us as native peoples to affirm our autonomy and protect our communities - stopping methane waste does both.”

Laurie Weahkee
Native American Voters Alliance

“The Navajo are more than environmentalists. We are part of the land and know what it means to be good stewards. We have seen the boom and busts of oil and gas development dating back over the last hundred years in San Juan County, Utah.

“In an area that often struggles economically, we cannot afford to waste our natural resources in good times or in bad. This is why it is so critical that we ensure our resources are developed as responsibly as possible and that we are investing in our communities for a diverse and just economic future.

“Plus, cutting this waste is good for the health of Navajo communities. About eight percent of the population suffers from asthma, and by cutting emissions we can reduce air pollution.”

Kenneth Maryboy
Commissioner, San Juan County, Utah & Mexican Water Chapter House President

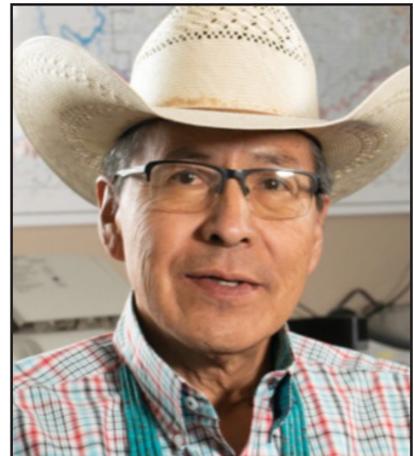


Photo: Kenneth Maryboy



Photo: Adella Begaye

“When oil and gas companies emit pollution into our air, they damage our environment and threaten our health. Securing the Navajo Nation’s wellbeing means stopping wasteful emissions like methane and the harmful chemicals that so often come with it.

“Strong rules to prevent methane waste would not only honor and preserve our resources, they would mean significantly more revenue for both the Navajo Nation and allottees. It’s up to us to defend the lands we depend on and recognize the health and economic benefits that come with responsible action.”

Adella Begaye
Diné C.A.R.E



GETTY

Conclusion and policy recommendation

Efforts to cut methane pollution from oil and gas development on Navajo lands will increase tribal revenue needed to fund education, roads, bridges and other important projects, as well as better protect the health of local communities. This analysis shows that the Navajo Nation is currently being forced to bear a disproportionate share of methane waste and pollution. Absent federal regulations that are in the process of being weakened and repealed by the Trump administration, it will be up to the Navajo Nation to exercise its sovereign authority to act and fill this gap.

The Navajo Nation Environmental Protection Agency is in the process of considering the establishment of a minor source air pollution permitting program. This effort could be a strong, positive step toward better regulation of oil and gas development and reduced pollution on tribal lands. In particular, we commend the Navajo Nation on its plans to develop general permits for oil and gas stationary sources. The establishment of robust general permit requirements can help reduce the emissions that lead to harmful methane and VOC pollution. These requirements can also set a strong standard for future efforts to address methane pollution from existing oil and gas sources.

As the Navajo Nation EPA moves forward with this proposal, we hope they will consider the suggestions below regarding control requirements that will help to ensure VOC and methane emissions are rigorously controlled using modern pollution control technologies:

- Standards and requirements to address emissions of all hydrocarbons (both VOCs and methane).
- At least quarterly leak inspections using optical gas imaging cameras or other equipment capable of delivering equivalent emission reductions, coupled with expeditious repair timeframes and detailed recordkeeping and reporting.
- Robust requirements that reduce designed and unintentional venting from all sources with the potential to vent VOCs and methane, including storage tanks, pneumatic devices and glycol dehydrators (E.g., 98 percent control of emissions from storage tanks and zero bleed pneumatic devices).
- Robust requirements that require capture of produced associated gas and plans to ensure the availability of pipelines.
- Detailed recordkeeping and reporting requirements in order to demonstrate compliance and provide transparency.
- Robust public involvement and notice requirements giving ample opportunities for impacted communities and chapters to meaningfully engage ■



Photo: Bill Vorasate

Methodology

This component-based analysis attempts to capture methane emissions from upstream and midstream sources in the base year of 2014.

Identifying relevant production sites:

- Wrote script to aggregate monthly production totals from DrillingInfo at all sites near the Navajo Nation.
- Wrote additional script to collate necessary data to convert .csv production totals into a shapefile.
- Used ArcGIS to find intersection of Navajo Nation census boundary and the shapefile of all nearby production sites.

Emissions scaling:

- Scaled WRAP San Juan Basin total emissions by Navajo Nation production for majority of components.
- Scaled total Navajo Nation production by emission factor observed in San Juan Basin in *Marchese et al.* to estimate gathering station emissions.
- Scaled total Navajo Nation production by emission factor observed in *Zimmerle et al.* to estimate transportation and storage emissions.
- Scaled Environmental Defense Fund New Mexico inventory by Navajo Nation production to estimate emissions from processing, liquids unloading and abnormal process conditions.

Well completions:

- Used DrillingInfo to identify sites with an initial production date in 2014.
- Multiplied initial daily gas production multiplied by median well completion time.

Flaring/venting:

- Scaled statewide Energy Information Administration total emissions by Navajo Nation production.



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