Regulating Emissions: The Impact of New Mexico's Flaring Rules*

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Methane emissions account for about 30% of the rise in global temperatures since the pre-industrial era (IEA 2023*a*). Methane emitted from oil and gas production is a prime target for mitigation efforts worldwide: the industry accounts for a large share of total anthropogenic emissions and many emissions sources are relatively inexpensive to abate (IEA 2023*b*). Despite significant attention on the issue, there is limited evidence on which policies are actually effective at reducing methane emissions from in this sector. One prominent type of policy is a limit on flaring, the burning of excess natural gas. Flaring limits have been adopted in jurisdictions including Algeria, Brazil, Mexico, Nigeria, and several U.S. states (World Bank n.d.). We evaluate the impact of rules adopted in New Mexico in 2021 that, among other things, required that companies meet strict flaring caps or be subject to fines. We compare flaring and methane emissions before and after the policy change to show that the policy had no discernible effect on either outcome. We use a model of producer decision making to show that the policy was not accompanied by expected penalties large enough to offset the private benefits of flaring.

Natural gas flaring is a globally important emissions source. In 2022, flaring released 500 million metric tons of CO_2-equivalent emissions, or over half of the total emissions from aviation (Lombardo 2025; de Oliveira Bredariol and McGlade n.d.). Emissions from flaring include both CO_2, which is produced when methane is combusted, and uncombusted methane, which escapes during flaring.[1] Although producers do not internalize the emissions cost of flaring, there is a private cost to flaring: flared gas could otherwise be sold, earning producers revenue. However, when natural gas prices are low or transmission costs are high, producers may find it privately optimal to flare gas rather than to capture and sell it (Elhai and Fronsdal 2025). For flaring restrictions to bind, regulations must impose costs on producers such that the sum of regulatory and other private costs of flaring exceed the private benefit.

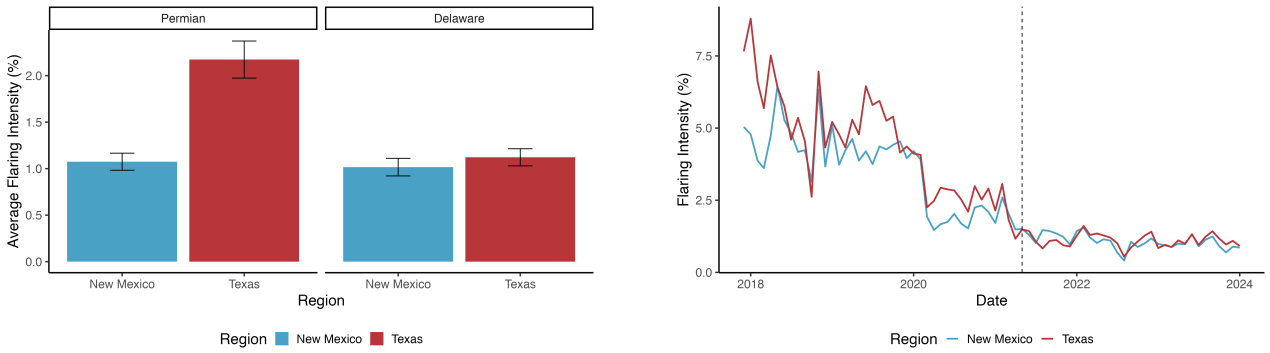
We use a combination of producer-reported data and satellite-based measures of flaring to empirically evaluate the impact of New Mexico's 2021 flaring rules. We examine flaring in the New Mexico portion of

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[1] Flaring is about 91% effective at combusting methane, according to research by Plant et al. (2022). The social cost per ton of methane is over ten times that of carbon dioxide (EPA 2023).

the Permian Basin to that in the Texas portion before and after New Mexico's rules were passed.[2] In the years following the policy change, flaring intensities were indeed higher in the Texas Permian than in the New Mexico Permian. However, when we restrict our sample to the Delaware sub-basin, the portion of the Permian that spans both states, intensities were nearly identical (Figure 1a).[3] Furthermore, we find no evidence of a change in relative flaring intensity after the 2021 rules were passed (Figure 1b). This null result is consistent across both self-reported and satellite-based measures of flaring. We estimate a producer-level difference-in-differences model to formally test for an effect of the New Mexico rules on flaring. We find no statistically significant effect of the rules on flaring. We also find no effect of the policy on relative methane intensity, measured using satellite-based estimates from Varon et al. (2025), despite baseline differences in methane intensity between the two states.[4]

Figure 1: Flaring intensity of production in the Texas and New Mexico Permian



(a) Levels

(b) Time trends, Delaware Sub-basin

Notes: Panel (a) plots the average flaring intensity of production for the indicated regions, averaged across the period between January 2022 and January 2024. Panel (b) plots the average flaring intensity of production over time in the Delaware sub-basin of the Permian Basin. Flaring intensity is defined as the volume of gas flared per unit of gas produced. The vertical dashed line indicates when New Mexico's flaring rules were passed in May 2021. Flared gas volumes are measured by the authors using VIIRS data from Elvidge et al. (2013) and methodology from Lyon et al. (2021). Production data are from Enverus (2024).

We rationalize this null result using the model from our companion paper, Elhai and Fronsdal (2025). In this model, risk-neutral producers choose how many oil and gas wells to drill, as well as what share of their gas production to flare versus sell. We use this model to estimate the expected penalty that New Mexico would have needed to impose to achieve the flaring reductions targeted by the 2021 rules. We compare the estimated expected penalty to the penalties actually levied, which range from $200,000 to $500,000 (Webb 2023). We then compare the cost of achieving flaring reduction targets through penalties to the cost under an equivalent flaring tax with random audits.

Our work contributes to the literature on efficient emissions regulation. Similar to Lade and Rudik (2020), we calculate the inefficiencies introduced by a command-and-control policy relative to a market-based policy. We leverage our model of producer flaring decisions to demonstrate how the costs of complying with flaring

[2] During this period, Texas did not have comparable flaring restrictions in place.

[3] The Delaware sub-basin is a geologically distinct area that features higher gas-to-oil ratios than other parts of the Permian. Our previous work suggests that higher gas-to-oil ratios may lead to lower flaring intensities.

[4] We suspect this underlying difference is explained by differences in gas productivity and well ages. We will explore this further in the full paper.

rules can vary with market conditions. Our work also draws on the literature on mechanism design for emissions abatement (Cicala, Hémous and Olsen 2022; Lewis, Wang and Ravikumar 2025; Dunkle Werner and Qiu 2025; Marks 2022). Our results emphasize that well-intentioned policies that lack strong enforcement and monitoring may fail to achieve their intended effects.

Second, we add to the limited existing evidence on the effectiveness of policies aimed at reducing carbon emissions. The New Mexico flaring rules have been lauded in the media as an example for other oil- and gas-producing states to follow (Milman 2023). New Mexico's governor has claimed that the state's rules are responsible for significant emissions reductions and economic benefits (Office of the Governor: Michelle Lujan Grisham 2025). Our results suggest that these claims may be overstated, highlighting the importance of causal analysis of implemented policies.

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