

Regulations are failing to manage methane from oil production

Bans on flaring – burning off methane gas that leaks out as a natural byproduct of oil production – aren't working, and could even be incentivizing direct releases of methane into the air.

Based on Raphael Calel and Paasha Mahdavi. 2020. "The unintended consequences of antiflaring policies—and measures for mitigation." *Proceedings of the National Academy of Sciences (PNAS)*.

The Policy Problem

Oil reservoirs contain significant quantities of methane, a powerful greenhouse gas that can leak out when oil is produced. At oil wells around the world, more than 140 billion cubic meters of methane is burned off or "flared" every year, transforming it into carbon dioxide and other greenhouse gases that contribute to climate change. Just as much methane is directly released or "vented," which can make as much as a 16 greater contribution to global warming over time. Flaring and venting together waste 8% of global natural gas production annually, contribute 6% of global emissions, and disperse a range of pollutants that harm human health and local environments. Yet current efforts to curtail the problem are struggling to make headway.

Key findings and proposed solutions

- Current policies to manage methane at oil sites are flawed: not only do they fail to prevent flaring, they also incentivize methane venting and leakage.
- Subsidizing pipelines and gas processing sites can reduce flaring, but will increase overall greenhouse gas emissions.
- Governments should design new production taxes that, if adopted as the

primary means of financing gas infrastructure, would counteract many of the effects on downstream emissions.

- Governments should fund the development of satellites and other remote-sensing techniques for detecting methane emissions, which would give regulators the tools they need to effectively curb venting and flaring.

What We Found

We found no difference in flaring levels between projects that were funded by the Clean Development Mechanism versus those that were rejected. The only policy that works to stop flaring is financing new gas infrastructure, such as pipelines to urban centers or gas-fired power plants near oil wells. But this effectively provides a subsidy to the oil industry and creates additional downstream emissions from burning gas to produce power.

Even where policies seemingly reduced flaring, we found suggestive evidence that these policies incentivized direct venting of methane, a far more potent greenhouse gas than carbon dioxide emitted during flaring. We argue that this is an example of the economic theory of “multitasking,” whereby firms substitute from an easily-observed task (such as flaring) to one that is more difficult to monitor (such as venting). We identified one potential instance of deliberate venting of methane at a compressor station in Turkmenistan, where the national oil company has been directly emitting methane—rather than burning the gas—in order to comply with the country’s prohibition on continuous flaring.

What We Did

We analyzed a massive satellite dataset of flaring—covering the entire globe at six decimal degrees (roughly 1-meter-by-1-meter squares) across the 2012–2017 period—to show how anti-flaring policies have on average failed to curb flaring. We also looked at the efficacy of the Clean Development Mechanism, which provides funds to reduce emissions at specific sites.

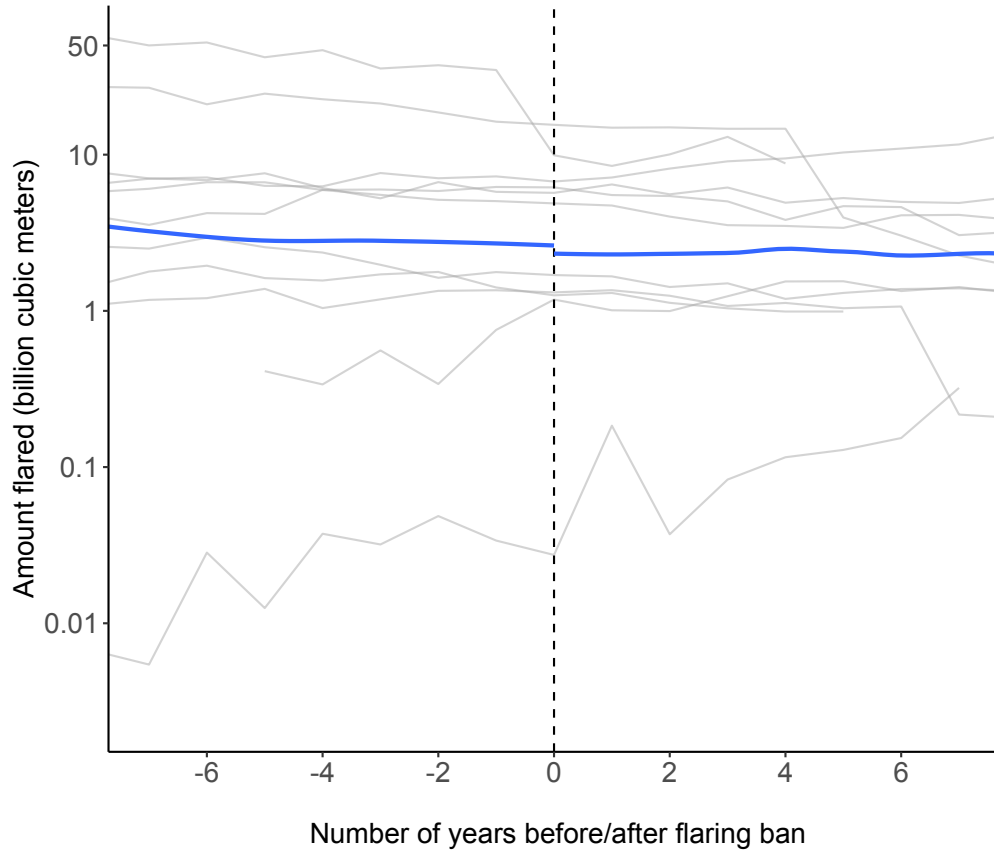


Fig. 1 Ineffectiveness of regulations to ban flaring. The graph shows the quantity of flared gas (on a log scale) for countries that have imposed a ban on flaring. The time-series are centered on the ban-year for each country and show flaring activity seven years before and after the ban. The fitted blue curve shows no sign of a structural break or meaningful downward trend as a result of flaring bans. We confirmed this finding using a separate test on the effectiveness of the Clean Development Mechanism (CDM): flaring at CDM-approved sites has declined no faster than at CDM-rejected sites, even though the producers receive carbon credits for every avoided ton of emissions.