

A View from the Fenceline: Evaluating Monitoring and Enforcement Policies to Reduce Oil and Gas Methane Emissions

joint with Thomas Covert, Ludovica Gasse, Michael Greenstone, Olga Rostapshova

Abstract: About 2% of natural gas production (13 billion kilograms of methane) is estimated to leak from US oil and gas (O&G) facilities each year. Methane contributes aggressively to climate change, with 34 times greater short-term global warming potential than carbon dioxide. We use a vehicle-mounted gas analyzer 1) to assess the extent of fugitive emissions from the O&G sector in Weld County, Colorado, and 2) to evaluate policies to reduce these emissions. In partnership with the Colorado regulator, we used a machine learning model to target inspections at facilities with a high predicted risk of violation. Ex-post, facilities that we flag as high-risk have higher hit rates as measured both by regulatory inspections and by our gas analyzer. Then, we ask whether fugitive emissions arise and persist because of perceived low risk of enforcement or because operators lack information on the riskiness of their own equipment. We test these hypotheses with two randomized controlled trials. First, the regulator notified operators that some of their facilities have been flagged by our machine learning model as high-risk, but we only include a random subset of high-risk facilities in these lists. This treatment could be interpreted as a bundling information and heightened risk of enforcement. Second, we notify a random subset of low-risk facilities (excluded from the first experiment) when we identify potential emissions at their sites. Preliminary results indicate that firms respond to heightened risk of enforcement, but not information alone.