

'Excess emissions' make significant contribution to air pollution

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When Hurricane Harvey struck Texas in August, industrial facilities in the state shut down, then reopened a few days later. In doing so, they produced nearly 2,000 tons of "excess emissions"—air pollutants in addition to what was allowed as part of their normal operation.

A study by Indiana University researchers shows that excess emissions—which occur with plant shut-downs, start-ups and



malfunctions, and not just in connection with natural disasters—can make serious contributions to overall air pollution. Yet excess emissions have not received a lot of attention from researchers or regulators, the study's authors said. Only three states—Texas, Louisiana and Oklahoma—systematically track and report excess emissions and make the data public.

"These emissions are significant," said Nikolaos Zirogiannis, a scientist at the IU School of Public and Environmental Affairs and an author of the study. "They are a regular feature of the operation of industrial facilities, and a single event lasting from a few hours to a few days can produce a large quantity of emissions."

They also can have a serious impact. The study includes an analysis that concludes excess emissions in Texas cause approximately \$150 million a year in negative health consequences.

The study, "Understanding Excess Emissions from Industrial Facilities: Evidence from Texas," has been published online by the journal *Environmental Science and Technology*. Additional authors are SPEA assistant professor Alex Hollingsworth and associate professor David Konisky.

It is the first study to examine statewide excess emissions of a range of air pollutants produced by multiple industrial sectors over a period of time, from 2002 to 2016. Industrial sectors include refineries, oil and gas fields, chemical plants and natural gas facilities.

The researchers found that a few events at a handful of facilities produced a large share of excess emissions. The typical excess event produced about 1 ton of emissions, but some produced more than 1,000 tons. In the refining sector, six refineries caused 77 percent of carbon monoxide excess emissions.



Over the period of the study, excess emissions boosted routine emissions in Texas by 7.5 percent for volatile organic compounds and about 2 percent for <u>sulfur dioxide</u> and carbon monoxide. But in certain industrial sectors the figures are larger; in oil and gas fields, for example, excess emissions of sulfur dioxide increased routine emissions by 17 percent.

In some facilities, excess emissions produced more pollution than normal operations. At one refinery, a 56-hour event in 2003 released more sulfur dioxide than the plant was permitted to emit for the year.

Under the Clean Air Act, industrial facilities are issued permits that place limits on the emissions they are allowed to produce during normal operations. But facilities also produce excess emissions when pollutioncontrol equipment malfunctions and when plants are shut down or started up, either for planned maintenance or as a result of weather events or other interruptions.

The U.S. Environmental Protection Agency looks to states to regulate emissions through state implementation plans. But it wasn't until 2015 that the EPA began pushing states to effectively regulate excess emissions. With a recent change in leadership at the EPA, the enforcement of regulations on excess emissions may be in flux, the researchers say.

More information: Nikolaos Zirogiannis et al, Understanding Excess Emissions from Industrial Facilities: Evidence from Texas, *Environmental Science & Technology* (2018). DOI: 10.1021/acs.est.7b04887

Provided by Indiana University



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