

Traffic Is Way Down Because Of Lockdown, But Air Pollution? Not So Much

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With traffic dramatically down in recent months, the United States is in the middle of an accidental experiment showing what happens to air pollution when millions of people stop driving.

The air is clearer. But the pollution declines aren't nearly as large as early indications suggested, according to an NPR analysis of six years of Environmental Protection Agency data.

In some cities, the amount of one pollutant, ozone, has barely decreased compared with levels over the past five years, despite traffic reductions of more than 40%. Ground-level ozone, or smog, occurs when the chemicals emitted by cars, trucks, factories and other sources react with sunlight and heat.

NPR analyzed more than half a million air pollution measurements reported to the EPA from more than 900 air monitoring sites around the country. We compared the median ozone levels detected this spring with levels found during the comparable period over the past five years.

Our analysis revealed that, in the vast majority of places, ozone pollution decreased by 15% or less, a clear indication that improving air quality will take much more than cleaning up tailpipes of passenger cars.

In cities such as Los Angeles, stubbornly poor air quality during the coronavirus lockdown underscored how vast fleets of trucks are a dominant source of pollution. In industrial cities like Houston, refineries and petrochemical plants spew considerable air pollution. And in Pittsburgh and across a swath of the eastern U.S., much of the air pollution still comes from burning coal.

Scientists say those cities, where air pollution often exceeds federal health standards, will likely have to change the way they generate power, manufacture goods and move those goods around if they hope to have healthy air.

"I think it's a really important [question] to think about: What can we learn from decreases in traffic pollution?" says Jenna Krall, a statistician and air pollution expert at George Mason University. "It will give us more information about what these pollution mixtures could look like [with] fewer people driving."

Los Angeles — trucks overtake cars

Initially, the virtually nationwide lockdown appeared to have dramatically positive results. In early April, NASA published satellite images of pollution disappearing over New York City.

After California issued a stay-at-home order in mid-March, greater Los Angeles saw the longest stretch of clean air that had been documented in decades. In Los Angeles, the skies seemed to clear just as rarely seen images of nearly empty freeways began to make headlines. It was welcome news for an area with some of the highest levels of ozone in the country, often exceeding federal health standards.

Breathing polluted air for long periods of time can damage the lungs and make it more difficult to fight respiratory disease. Ozone pollution is especially detrimental to children and elderly people and those with asthma, emphysema and other respiratory illnesses. The COVID-19 pandemic adds another respiratory disease to that list.

But the cleaner air wasn't just about reduced traffic.

A series of rainstorms swept through Southern California in March, which helped remove pollutants from the air. But as the weather warmed up in late April and early May, the air quality worsened, even hitting the "very unhealthy" warning category from the EPA.

"There was a lot of pressure on us to come up with the answer that everyone wanted to hear, which is that the COVID-19 measures have cleaned the air in Southern California," says Philip Fine, deputy executive officer at the South Coast Air Quality Management District, which regulates air quality in greater LA.

Overall, ozone levels were down only 14% in late March and April compared with the same period over the previous five years, according to NPR's analysis. The modest drop points to a fact air regulators have long emphasized: Cars are not the biggest air pollution problem in Los Angeles.

"I've read a lot of newspaper articles over the past couple weeks that have said if only we can have people telecommute one day a week across the entire basin, our air quality problems will be solved," says Fine. "And unfortunately, it's not that simple."

As passenger cars have gotten cleaner, they've become a relatively smaller source of pollution. Heavy-duty transportation, such as trucks and buses, now accounts for the largest source of nitrogen oxides, which form ozone, in the area. Major ports in Los Angeles and Long Beach handle more than 30% of the nation's shipping container traffic, requiring a vast network of ships, trucks and trains coming in and out of the region.

Emissions from those sources, combined with hot and stagnant weather, cause air pollution to hit dangerous levels during the summer, which puts the region out of compliance with federal air standards. Low-income communities are hit the hardest.

While activity at the region's ports has slowed with the pandemic, trucks have largely stayed on the roads to ensure that goods are arriving in stores. At the end of April, truck activity was down only about 8% across California, according to the American Transportation Research Institute.

In a strange wrinkle, the reduction of one pollutant can also make ozone slightly worse. Cars and trucks produce nitrogen oxides, also known as NOx. While that pollutant helps form ozone, under some conditions it can temporarily break down ozone molecules. So with less NOx being emitted recently, ozone hasn't been suppressed as much.

"Small reductions in NOx actually increase ozone," says Cesunica Ivey, assistant professor of chemical and environmental engineering at the University of California, Riverside. "So we're just going to have to be more aggressive with our sustainable transportation solutions."

Severe Los Angeles smog in the 1950s and '60s prompted California to ultimately pass some of the most aggressive air quality regulations in the country. The state still sets its own tailpipe emissions standards for cars, apart from the federal government. The Trump administration is now seeking to revoke California's legal authority to do so.

California also has an ambitious target for putting 5 million electric cars on the road by 2030. That could help lower emissions because instead of burning gasoline, those cars would run on electricity, largely generated by solar, wind and hydropower in the state.

Now California is crafting a similar policy for trucks. State regulators are expected to vote on rules in June that would require truck manufacturers to sell all-electric or fuel-cell trucks in the state — from delivery trucks all the way to tractor-trailers. The policy would begin in 2024, requiring that 5% to 9% of sales be electric, depending on the type of truck. By 2035, it would be up to 40% to 75% of sales.

Some truck manufacturers have pushed back against the proposal, saying the market for selling electric trucks hasn't developed yet. Supporters say higher sticker prices would be offset by fuel savings over time, and when paired with California's other efforts to reduce greenhouse gas emissions, could potentially save thousands of lives by improving the air.

"We don't need a pandemic to breathe cleaner air," says Yifang Zhu, professor at the Fielding School of Public Health at the University of California, Los Angeles. "There is a sustainable way for a society to achieve a cleaner world in the future. We need to do more than we're doing right now."

Pittsburgh — coal on display

Less car traffic makes pollution from coal more obvious in the broad swath of Midwestern and Eastern states where the majority of coal-fired power plants are still operating. Compared to passenger cars, burning coal releases large amounts of air pollution, including nitrogen oxides and small particulate matter, or soot.

Nowhere is the role of coal in air pollution more evident than in Allegheny County, Pa., where Pittsburgh is located. The county is home to a major coking plant that uses coal to make the fuel for the blast

furnaces in steel factories, as well as a coal-fired power plant. Both continued to operate during the lockdown along with other steel facilities clustered in and around the county.

Between March 15 and the end of April, NPR's analysis found ozone levels in the Pittsburgh area dropped about 9%, compared with 14% in Los Angeles. Across the coal-intensive Ohio River Valley, the analysis concluded that in major cities, ozone dropped only between 3% and 8%.

Scientists say that's not surprising because coal is the dirtiest of fossil fuels. "Unlike a lot of the eastern part of the United States, there's not much, if any, coal-fired power plant production in California," says Emily Elliott, a geochemist at the University of Pittsburgh who studies nitrogen oxides.

Pollution from burning coal also affects a larger area than vehicle emissions, which means modest air pollution reductions in East Coast states may partly be because of their location downwind of coal-fired facilities. "If you think about a power plant that has a tall smokestack, those emissions are going high aloft in the air and they're going to travel long, long distances compared to a vehicle tailpipe that's close to the ground," Elliott says.

Houston — the petrochemical industry's role

Coal is not the only industry culprit for poor air. NPR's investigation found that residents of Houston did not breathe significantly cleaner air during the lockdown, despite a 40% reduction in local traffic.

Houston experienced an 11% decrease in ozone. Daily ozone levels in Houston were still high enough to trigger an air quality warning in the city in mid-April.

The Houston metro area is home to the largest concentration of petrochemical facilities in the country. Refineries and chemical plants are major emitters of not only nitrogen oxide, but sulfur dioxide, which also contributes to smog and haze.

NPR's analysis also found only modest decreases in Houston's soot pollution during the lockdown. The median amount of soot in the air decreased by just 13% in Houston compared with the previous five years, according to air monitoring sites that reported data between March 15 and the end of April. Air monitoring sites that reported comparable data in greater Los Angeles showed a 30% decrease. There was not adequate data to compare soot levels in Pittsburgh.

Chronic exposure to soot is associated with shorter life expectancies, lung cancer, diabetes and low birth weight and can exacerbate respiratory and cardiovascular illnesses.

Regulatory rollbacks could make industrial pollution more severe in the future. The Trump administration announced this spring that it will not strengthen limits on soot, despite an assessment published earlier this year by EPA scientists that found that a stronger standard would save lives.

An accidental experiment

Scientists around the country say reduced car traffic offers them an unexpected opportunity to study how cars, trucks, factories and power plants contribute to air pollution and to test the assumptions that go into pollution models.

One such study is already underway at Texas A&M University, where atmospheric scientist Gunnar Schade examined preliminary air data for the city of Houston and found that levels of particulate matter increased slightly in at least one location in Houston during the lockdown.

"That was a somewhat surprising result, that particulate matter is not going down at all," he says. "We assume that car traffic does contribute to [small particulate pollution]. It has in the past."

Schade's analysis, which has not been peer reviewed and is still being updated as more data becomes available, also suggests that particulate pollution decreased more in residential parts of Houston than it did in industrial areas.

Schade says it's too soon to be sure whether that means the pollution came from the industrial sites — he needs more data.

Despite decades of research and a relatively robust set of satellites and ground-based air monitors, there are still sizable holes in our understanding of how different sources of air pollution contribute to overall air

quality, according to Elena Craft, the director of climate and health at the Environmental Defense Fund in Texas.

The pandemic could help make scientific models of what are called emissions inventories more accurate. "If you take all the cars off the road and it doesn't put a dent in your emissions inventory, then probably cars are not making up a lot of that inventory," explains Craft. "But if, on the other hand, you take all the cars off the road and air quality is great, then you may tweak the models."