

Do You Know What You're Breathing?

As distrust in the government grows, personal pollution monitors are the hot gift this holiday season.

By Nellie Bowles

Nov. 30, 2018





A man on the streets of Sacramento in November. Rich Pedroncelli/Associated Press

The hottest new apocalypse preparation choice for 2019 is not a bunker or a gun or a lifeboat. And it's not moving to New Zealand. It's a small gadget that measures the air pollution around you.

As climate change reports become increasingly dire, and as wildfires tear across the American West, and as trust in the federal government's air quality oversight fades, thousands of people around the country are taking air measurements into their own hands.

Installed on a porch, a console table or hooked to a backpack, these small, sleek and increasingly inexpensive devices measure hyper-local air quality. They are marketed to the discerning and alarmed consumer. Some have begun to self-identify as

“breathers.”

The Atmotube and PlumeLab’s Flow are small and meant to be carried around, testing the air as a person walks or bikes, helping people plan routes that avoid bad air. The Awair looks like an old-timey radio and sits on a counter to test indoor air. Aeroqual’s particulate monitor, one of the most advanced, looks like an enormous old-fashioned cellphone.

The New York Times

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A Flow personal air pollution monitor from Plume Labs. Masaki Okumura/Plume Labs

But the monitor most intriguing local government environmental protection agencies and civilians alike is PurpleAir. It hooks up outside, connects to Wi-Fi, feeds into a global network and creates something like a guerrilla air quality monitoring network.

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Adrian Dybwad, 49, the founder of PurpleAir, would watch the dust from a nearby gravel pit blow near his house in Draper, Utah, where he lives with his wife. When the miners working there tried to expand it even closer, he decided he had to do something. First he had to prove there was something wrong with the air.

“I said to myself, it’s 2015, surely there must be a sensor that can tell me how much dust is in there,” Mr. Dybwad said.

But nothing he could find was both cheap and accurate. So he made his own.

Neighbors got interested. Mr. Dybwad, who has a background in computer networking and surface-mount electronics, asked for donations and raised a few thousand dollars, and the community installed 80 sensors. The amount of floating particles in the air (called particulate matter) was high, especially on windy days. The closest government-run sensor was more than 10 miles away, and not picking up any of this.

As the community gathered with sensors, plans for the mine expansion vaporized.

In the last year, interest in the project has spiked. Now he has more than 3,000 monitors reporting data every day. He has built a map to show what every PurpleAir around the world is reporting (green is good, red is bad). Local government air quality monitoring groups are using the devices.

The Awair air pollution monitor. Getawair.com

Since the California wildfires in November, Mr. Dybwad said, traffic has been up 10,000 percent. In November, he moved production out of his backyard and into a new 2,200-square-foot workshop.

“You can’t give the government control over monitoring and enforcement because then you can just monitor to the extent that you want to enforce,” he said. “Having this type of power in the public’s hands, it gives a check on the government.”

Vera Kozyr, the chief executive of Atmotube, said her company sold 8,000 of its first version and is introducing a new tube in December.

“We’ve seen a huge increase of interest in the last few months, especially from the U.S.,” Ms. Kozyr said. “Awareness is just starting.”

Fans of the new pollution monitors tend to also be skeptical of government efforts to keep air clean and say they are wary of the air quality data that the government provides. “At some points,” Ms. Kozyr said, “you can’t trust the government.”

The Trump administration has urged the Environmental Protection Agency to ease air quality rules. New E.P.A. leadership seems to be on board with this plan. The administration is working to overhaul restrictions on coal, which by its own estimates could lead to as many as 1,400 more premature deaths annually by 2030 from an increase in the airborne particulate matter.

President Trump claimed in October that the United States has the cleanest air in the world, which is inaccurate. The administration in August unveiled plans to freeze antipollution and fuel-efficiency standards for cars. Outlining the effort, the E.P.A. acting administrator, Andrew Wheeler, and the secretary of transportation, Elaine L. Chao, published an opinion piece in The Wall Street Journal called “Make Cars Great Again.”

Mr. Wheeler announced in October that next year the E.P.A. would be disbanding a key scientific review panel on clean air and pollution.

An Atmotube Plus personal air pollution detector.

Tony Cox, who sits on the E.P.A. committee on clean air, has said that the benefits of clean air are exaggerated and, in a paper sponsored by the American Petroleum Institute, that it cannot be shown that particulate matter in the air leads to deaths; this is contradicted by information provided by the E.P.A. Robert Phalen, a researcher who joined the E.P.A.'s board of science advisers to work on air quality issues, has said that air has gotten too clean.

“Do we have sufficient monitors? No. There’s not enough of them,” said Janice E. Nolen, the vice president of the American Lung Association, citing both lack of funding and industry interests. “People don’t necessarily want to know where air quality is bad in some cases.”

“Of about 3,000 counties” in the United States, Ms. Nolen said, “only eight or nine hundred have air quality monitors at all.”

Having so few monitors means that something like the downwind effects of a wildfire can be hard to detect.

“It can be frustrating to residents when they see the air is bad, and then they look at a map and it’s showing green or good because none of the monitors happen to be downwind of the smoke,” said Sam Atwood, who works for the air quality management district that oversees much of Southern California. He installed a PurpleAir in his backyard.

The monitors his district operates can cost over \$100,000, Mr. Atwood said. A PurpleAir monitor goes for \$180 to \$260. So Mr. Atwood’s district, with funding from a 2016 E.P.A. grant, is now running a pilot program to test low cost monitors with community groups across the state.

An Aeroqual personal air pollution detector.

Jim Leach, a retired information technology professional in Lafayette, Calif., realized that the closest government air quality sensor to him was six miles away in a quiet residential neighborhood. But he lives in a narrow valley with eight lanes of freeway running through it. For car pollution in particular, small distances can make a big difference in how much pollution is in the air.

“What that sensor picks up is just not accurate for us,” Mr. Leach said.

He put a PurpleAir outside his house. The reading alarmed him. “I realized we had a much bigger problem than I’d thought,” Mr. Leach said.

Neighbors joined in. Now about a dozen houses nearby are also monitoring.

“One thing I get asked quite a bit is, ‘Why don’t we know about this already? Why don’t we know?’” Mr. Leach said. “People are starting to wake up and ask what is this stuff and how do I need to be protected.”

Now he is working with a local nonprofit to finish installing PurpleAir monitors in all the public schools in his city.

Some companies selling high-end industrial-grade air quality testing systems are surprised by the rising consumer interest.

With most of the Aeroqual sensors costing several thousand dollars, Carl Beck, the company's vice president of product, was shocked when a customer bought one to take on walks around New York.

“We didn't imagine that our instruments would be used by consumers,” Mr. Beck said, calling the sudden new market “a revelation.”

Miles Keogh, the executive director of the National Association of Clean Air Agencies, bikes around his home in Alexandria, Va., and worries a lot about what he breathes.

“What is it citizens — breathers — can do?” he said.

About two weeks ago, he strapped an air quality sensor called the Plume Labs Flow to his backpack to see how much he was exposed to along his bike rides. His fellow bike commuters are doing the same.

“My fellow bike commuters and I like to run around and say I ran into an orange spot,” Mr. Keogh said.

Many early adopters of private air quality monitors are people who are deeply familiar with the government's pollution monitoring systems.

“I tell my friends, ‘You don't want to know what I know,’” said Joe Lyou, who sits on the South Coast Air Quality Management District Governing Board. “There's a lot of pollution.”

He installed a PurpleAir two years ago and is now gathering neighbors together to do the same.

Mr. Lyou said he is concerned the Trump administration will try to hide air quality data after it has been collected.

“I’m worried that they’ll distort or spin the data in a way so that people are confused or misled. They’ll bury it or make it confusing to understand,” Mr. Lyou said. “It’s already happening.”

And so for now, Mr. Lyou trusts the monitor in his backyard.

“I’m downwind of two power plants, a refinery and next to a freeway,” he said. “And I have a kid who’s asthmatic.”

The sensor helps Mr. Lyou decide when it’s safe for his son to play outside.

A PurpleAir monitor.

Mark Dixon, a filmmaker in Pittsburgh, started a local PurpleAir movement after feeling sick on jogs.

“I knew the air was bad because it stinks,” Mr. Dixon said. “A foul industrial stench.”

He used an app called Smell PGH that tracks industrial odors. When he started reading about air quality enforcement, he realized that some factories around the town were still polluting above the legal limit.

“I felt betrayed as a citizen,” he said. “They’re polluting at our doorsteps and we know it and we can see it and we can smell it, and now we can measure it.”

He has been building the network out this fall and hopes to use the data to push the government to crack down. Poor and minority communities are disproportionately affected by air pollution, and a revived environmental justice movement is rising.

One home that Mr. Dixon outfitted with a PurpleAir this summer is across the river from Edgar Thomson Steelworks and near a coke refinery that emits a rotted sulfur smell. That’s where Robin Kornides, 63, lives with her husband and makes her living selling sewn and knitted goods.

One recent November afternoon, she stood on her front porch in a sweatshirt and gloves, taking a break from caring for a troupe of pet pigeons to talk about the gadget.

But other days, she is not so lucky.

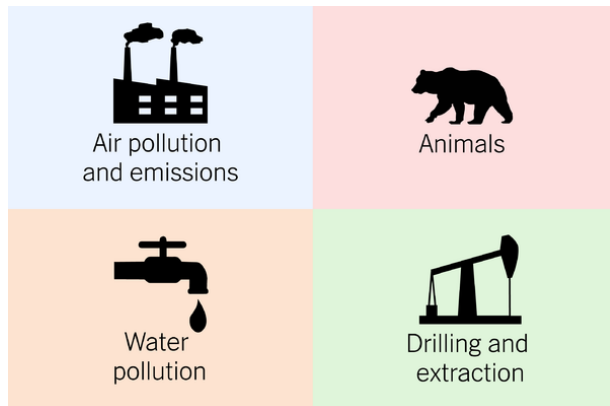
“A third of the time it’s bad enough that I don’t want to go outside, but it mostly depends how the wind is blowing,” Ms. Kornides said. On the worst days, she added, “It’s like trying to breath Jell-O.”

That day there was a cool crisp east wind — she thinks of it as the good wind.

“It makes me feel justified to complain at least, and I’m a visual person, so I like seeing the color on the app,” Ms. Kornides said. “But I can always smell it first, that coke smell.”

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Nov. 21, 2018

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A version of this article appears in print on Dec. 2, 2018, on Page ST8 of the New York edition with the headline: The American Citizen's Guide to Clean Air