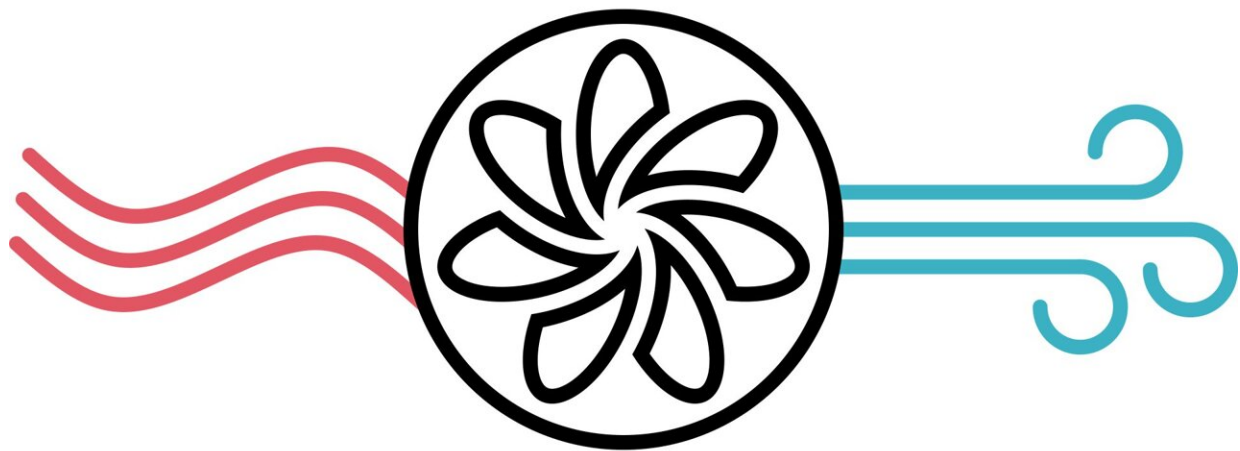


Sealing homes' leaky HVAC systems: A sneaky good climate solution

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There's a hidden scourge making homes more harmful to the climate and less comfortable: leaky heating and cooling systems. Plugging those leaks may be the dull stepchild of the energy transition, but that doesn't make it any less important than installing dazzling solar arrays and getting millions of electric vehicles on the road.

The problem, however, is that [energy efficiency](#) pays back over time,

but it comes with high upfront costs.

"It can be a very, very labor intensive process to capture all the efficiency improvements in the housing stock and a lot of the issues—as well as a lot of the solutions—are pretty much unknown, or invisible to the average consumer," said Jennifer Amann, a senior fellow with the American Council for an Energy Efficient Economy's buildings program.

"You could pay somebody a few \$1,000 to come in, and insulate your home and do air sealing, but those aren't improvements that you are going to see or engage with," Amann said. "So a lot of times people are thinking, 'Well, do I want to do that, or do I want to make some improvements in my kitchen or in my bathroom.'"

Aeroseal, a company whose technology was developed in conjunction with Lawrence Livermore National Laboratory, has an ingenious solution. Its computer-tracked system finds and targets leaks, including even those behind walls, and then releases an aerosolized sealant to fill them.

Taking it to leaks

Typically, sealing a home involves a technician searching for cracks and filling them by hand. It's a time-consuming and costly process. Aeroseal's technology makes the hunt for leaks easier.

The startup, which won a BloombergNEF Pioneers award, works on new construction just after the drywall stage. For a new building, the contractors seal the entire structure—sometimes by putting a bubble over the house—and then use a fan to blow air into the home and essentially pressurize the interior. Technicians then insert a sensor that can take pressure readings to discover how much air is leaking through

cracks in the floorboards or joints in the wall.

After this stage is complete, the company releases an aerosol into the home that spreads like a fog. The pressure differential allows it to be quickly sucked into the leaks.

The non-toxic, water-based sealant coagulates on contact with the edge of the crack and forms a new barrier. Technicians monitor the leakage rates in real time on a computer. For an average-sized residence, the whole process can take 60 minutes and cut leakage by about 80%, the company says.

Behind the walls

But it is not just new homes that AeroSeal tackles. Ductwork in older homes is a major energy efficiency issue. A typical American house loses 20% to 30% of hot and cold air through leaky ducts, according to the Department of Energy, creating an incredible opportunity for savings.

If you have high energy bills or big temperature differentials from room to room, you likely have leaking ducts. But HVAC contractors rarely make this connection for homeowners and renter, says Amann. It's also hard for individuals to understand, let alone, prioritize behind-the-scenes repairs.

Sealing ducts is also an arduous process: Accessing them can be difficult because most are behind walls once a building is completed.

For existing buildings, including [single-family homes](#) and [commercial buildings](#), AeroSeal can narrow the process so that technicians focus on ducts alone instead of sealing the whole building.

The first step is to block all the known vents in the system and detach the boiler. Technicians then attach a tube to the vent system and hook up the computerized measurement machine, allowing them to do the pressurization. This process can reduce leakage by 95%, the company says.

Going forward

Amit Gupta, the company's president, previously worked in energy efficiency at Carrier Global, the Florida-based HVAC systems giant. He recalled being wowed by the possibilities of Aero seal's technology.

"Here we were spending millions to improve the efficiency of a new boiler by just 2% and this is a way to address something that is there and a problem in every building," he said.

So far, Aero seal has been doing about 56,000 seals (sometimes there are multiple seals in a big building) a year. Last year, the company had revenue of just under \$40 million.

Part of the challenge to growing the company further, said Gupta, is getting contractors to pay upfront for the energy savings that will accrue over time. The average national cost for an Aero seal treatment is \$2,500, the company says. If no one is measuring the emissions of a building, an owner might opt for a cheaper option with a far less thorough seal.

But new laws, like New York City's Local Law 97, which goes into effect this year and aims to reduce emissions of buildings over 25,000 square feet by 40% by 2030, are creating standards that strengthen Aero seal's position, Gupta says.

This law "creates the driver for building owners to reduce their greenhouse gas emissions," said Gupta, and it is already fueling growth



in the business.

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