

Homeowners Are Hot On Energy Thieves' Trail

Arlington Audits Open Eyes to Drafts' Causes, Easy Fixes

By *Brigid Schulte*

Washington Post Staff Writer

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David and Susan Gaines live in a funky, 90-year-old bungalow in Arlington County with lots of charm. They like the wavy glass in the original windows. They love the high ceilings and period light fixtures. What they don't like, however, is feeling frozen in winter and cooked in summer and paying through the nose to the gas and electric companies for their discomfort.

They have forced-air vents in the ceilings for heating and cooling. But because of the laws of physics, hot air rises, so winter is a particular challenge.

"The heat is fine as long as you live on ladders," David Gaines said.

"Or walk around on stilts," Susan added.

They're the kind of people who grow their own vegetables, drive his and hers hybrids and ride battery-powered Segways to the farmer's market. Since buying the place in 1999, they've had a sinking feeling that their beloved, drafty old house may only be adding to the Earth's environmental woes.

So when Arlington County advertised a few months ago that it will give free home-energy audits to 20 lucky residents, they signed up immediately. "If we do this right, we may be able to single-handedly slow the effects of global warming," Gaines joked. "You have no idea how much energy we waste."

The free audits are part of Arlington's new initiative, announced this year, to reduce greenhouse-gas emissions by 10 percent from 2000 to 2012 and do its small part to keep the Arctic ice floes frozen. The thinking with the free audits, according to Paul Ferguson, the initiative's author and Board of Supervisors chairman, is that if the 20 people see how much energy they waste and make changes, they'll tell two friends, who'll do the same and who'll tell two friends who'll tell two friends. And over time there will be an appreciable decrease in the county's "carbon footprint."



At Susan and David Gaines's home in Arlington, Justin Aruck of EMO Energy Solutions describes how heat is being trapped in the attic. Aruck offered improvement tips. (By Michael Williamson -- The Washington Post)

"This will help us do our part for the environment," Ferguson said. His own home-energy audit at his Fairlington condo was eye-opening. It found that the recessed can lights installed in the ceiling during a kitchen renovation a few years ago were leaking air. That made the house feel drafty in winter, so he and his family would turn the heat up; in the summer, it was humid, so they'd turn on the air conditioner. That used more energy and cost more money.

He could fix the problem by replacing the recessed lights with energy-efficient sealed versions -- which would require ripping out drywall -- or putting weatherstrips around the existing ones. He opted for the strips. "People will be lured at first by the financial savings of a home-energy audit," he said. "But then, when they become more efficient, they can feel good about what they're doing for the Earth."

Home-energy audits, which run about \$300, primarily check for leaks and drafts. Companies in this new and rapidly growing field will also look at appliances, assess heating and cooling systems, and analyze energy bills. But just plugging the leaks in a house can often lead to the biggest energy and cost savings.

And that's how David and Susan Gaines came to find out, on a recent sweltering day after a three-hour energy audit, that their house has so many little holes and gaps that all its air escapes twice every hour. That's right, the auditor explained to the disbelieving Gaines: Every last molecule of expensively heated or cooled air in their house leaks out and is replaced and leaks out and is replaced again every hour, 24 times a day.

And their home is pretty typical.

Most older houses leak as much, said auditor Justin Aruck of EMO Energy Solutions, one of the home-energy audit companies the county has hired. New homes, on average, leak all their air over about an hour. Energy-efficient homes leak about one-third of the air every hour. And that's about right, he said, because any tighter and the house wouldn't get enough fresh air.

"The most amazing thing to me," David Gaines said, "was to discover that basically as an impermeable membrane, the walls of our house, rather than holding us safe and secure like a little nest, it's actually like living in the middle of a piece of Swiss cheese."

The good news, Aruck told them, is that leaks are pretty easy and inexpensive to fix. Doing so can reduce heating and cooling costs by as much as 30 percent.

For the audit, Aruck first walked through the house. Up in the sweltering, unfinished attic, the temperature made it feel like a sauna. The insulation, where there was insulation, was haphazardly installed on the side walls under the eaves, some of it falling down.

"Um," Aruck began politely, "this insulation is not doing anything at all." There wasn't enough in the floor.

The wall insulation was doing as much good as decoration. Unless insulation is flush against the wall, floor or ceiling, it is ineffective. The attic was so hot, it was warming the rest of the house.

The best thing they could do, Aruck suggested, would be to install a radiant barrier. A reflective barrier installed under the roof could lower the attic temperature by as much as 30 degrees by reflecting the heat back toward the roof rather than into the interior of the house. David Gaines, an actor, director and clown with the Big Apple Circus, looked struck, thinking that sounded expensive and complicated. "If you want to do it super cheap," Aruck told him, "just tape up aluminum foil. That can make a big difference."

"And keep the aliens out, too," Gaines muttered.

Next came the blower-door test. Aruck sealed every window and outside door and installed the giant blower in the front door's frame. The blower creates a vacuum inside, which lets the outside air rush in, to determine how much air leaks out of a house and, more important, where.

Susan Gaines, a sign language interpreter, spent the next hour feeling air rush in around her beloved old windows, under the shoe molding all

around the hardwood floors, through light switches, electrical outlets and overhead light fixtures, and, most surprisingly, directly through her kitchen cabinets. "It's blowing like the wind through here," she said, stunned. "Who needs air conditioning when you can just turn on your cabinets like this?"

Finally came the moment of truth. What could they do about this leaky old boat? Gaines, who had been scared away from making energy-efficient improvements after a contractor told him it would cost \$20,000 to replace his windows, braced for the worst.

Then Aruck came up with his list. Put toddler-proof plugs in the electrical outlets. Pull out the caulk gun and run it along the floorboards under the shoe molding and under the kitchen cabinets. Buy a can of spray foam to plug some holes. Think about using weatherstripping or rope caulk to better seal the windows. When the fireplace isn't being used, make sure the chimney damper is closed. Install the radiant barrier in the attic and more insulation in the attic floors.

Their old air conditioner will probably last a few more years, Aruck told the couple, but when its time comes, they should think about getting an energy-efficient one. But don't worry too much about it. "People think air conditioning is a big energy cost, but it's really not," Aruck explained. "The biggest energy user in a house is heat. It runs 35 to 55 percent of the total energy cost."

Aruck checked their annual energy bills and found that they spend about \$200 a year on air conditioning and \$1,400 a year on heating.

The Gaines looked relieved. "These are doable things," David Gaines said. "We can do them in little increments, and we won't have to go out and get a car loan to do it."

And, his wife added, they won't have to feel quite so guilty the next time they watch Al Gore's documentary, "An Inconvenient Truth."