Something in the Air: *Stirling Technology Inc.*

good health

By Kelee Riesbeck
Athens NEWS Contributor

Barb Campagnola is wondering why she isn't holed up in a plastic bubble somewhere breathing pure oxygen. She performs health research and marketing for Stirling Technology, Inc. (STI) in Athens, and knows plenty about an issue gaining a prominent place on the country's health radar — indoor air quality.

What about IAQ?

Indoor air quality (IAQ) isn't a household word — yet. Battelle Institute, a mega-corporation based in Columbus that develops new technologies and commercializes products for industry and government, ranks IAQ as the number one issue on the list of Top 10 Trends in Healthy Homes for 2010. "Increasingly energy-efficient home have created interiors that are a virtual soup of odors and fumes from indoor pollutants," states a June 6, 2001 news release from Battelle. "Americans spend 90 percent of their time indoors, and often the quality of air is worse than what we find outdoors. What you're likely to see on the market and in homes by 2010 are products for advanced air venting, air filtration, and biosensors that help fight humidity, mold and other indoor pollutants."

Campagnola said that terms such as "indoor air quality" and "indoor environment" don't ring internal buzzers for most people for two reasons.

"When we think of the word environment, we think of a lone wolf on a mountain somewhere," she said. "The 'environment' we live in is mostly indoors — in our homes, our offices, our cars."

While deficiencies in IAQ isn't a new health threat, Campagnola added, the problem doesn't get much coverage in the media, and thus awareness is minimal and the problem isn't widely understood. Simply prohibiting smoking in your home, while much better than having cigarette smoke linger inside, doesn't ensure that indoor air quality is good. According to the American Lung Association, eliminating cigarette smoke in your home eliminates about 4,000 chemicals, including 200 known poisons, from the air you and your family are breathing. But other elements remain inside the home that contribute to poor IAQ, elements that may not be obvious to the average person.

Then why do I feel fine?

You may think, "If all this is true, then why am I not gasping for air?" Campagnola noted that indoor pollutants include outgassing from synthetic fiber used in building materials and carpets; chlorine gas from faucets and gasses from cooking; and airborne allergens from pet hair and dander, molds, dust mites and outdoor pollens trapped indoors. People aren't slammed in one fell punch from all these pollutants. But over time, according to Campagnola, daily doses of this stuff can sometimes cause illnesses that are not able to be pinned down to any one threat. "We are exposed to so many chemicals everyday, we hardly notice it," she said.

"Sick Building Syndrome (the set of respiratory and allergic complaints that appear to be linked to conditions in a building) has a vague host of symptoms. But common sense tells us something, too. We are used to chemicals being in our lives, but at very low levels of exposure. The synergistic effects of chronic, low-level exposure is the problem." But one common disease is firmly linked to poor indoor air quality: asthma.

Asthma: On the Rise

"The main health threat related to IAQ is the increase of asthma in the United States for both adults and children," Campagnola confirmed.

"Asthma is the number-one chronic disease in the U.S.," she said. "Pediatric asthma has increased by over 160 percent. Asthma is a complex disease, and its causes are difficult to track. We know that asthma is caused by a combination of genetics and allergens, but we also know that environmental components contribute to asthma as well." Several public health institutes back up the claim that asthma can be related to poor IAQ. The National Asthma and Allergy Education & Prevention Program (NAEPP) states that a report put out this year "confirms the close relationship between allergy and asthma patients and the importance of reducing exposures to indoor air allergens."

The Centers for Disease Control (CDC) adds: "Indoor air pollution includes vapors from household cleaners and from gas stoves that are not properly vented, mold, mildew, animal dander and environmental tobacco smoke. Each of these pollutants leads to an asthma attack."

What's the answer to this problem? In most homes, especially those that are newly built or remodeled, increasing ventilation rates, along with employing filtration, can reduce the concentration of indoor pollutants by 80 percent, according to an article published in 2000 called "Clearing the Air" by the Institute of Medicine.

"Mechanical ventilation is the key component in creating and maintaining a healthier home," says the American Lung Association in their "Healthy House 2001" report. "Ventilation provides a fresh source of outdoor air into the home and dilutes indoor air pollutants."

RecoupAerator to the Rescue

Barbara Ley of Athens has trouble breathing inside her home. Last year she placed the RecoupAerator window unit in her bedroom. She calls the product "a miracle."

good health

Before she installed the energy-efficient air ventilation and filtration system in her home, walking up steps and doing minor chores exhausted her.

"My breathing had improved when doing everyday chores, shopping, sweeping, laundry, et cetera," she said about how she feels now. "I noticed while carrying several bags of groceries up my steps that I was breathing rapidly, but not panting or gasping. I carried approximately 10 to 12 bags and did not have to stop and catch my breath. Hooray! I have more energy and am able to be more active. I feel like it's a miracle. It's fantastic."
The RecoupAerator is an "energy recovery ventilator" (ERV) that is built around technology developed by Stirling Technology. Started in 1983 by Kate Chagnot, Stirling uses technology created by engineers such as Chagnot and Craig Kinzelman, who created the Stirling engines. Like ERVs, Stirling engines rely on the efficient transfer of large quantities of heat for their operation. Chagnot's goal was to create a ventilating product that uses this type of engineering. Hence the RecoupAerator was born.

"We are in the health comfort and safety product business," explained Kinzelman. "The use of the Stirling engine technology in the RecoupAerator allows for an effective heat exchange and makes it a practical ventilation option."

Confused? Are you asking yourself, "Couldn't I just open a window?" Read on.

Regular ventilation systems remove the air from inside your home (air you've just paid to have either heated or cooled) and replaces it with fresh, outside air. This air is not heated or cooled. Not very energy efficient, since you'd be revisiting the thermostat in the winter to heat things up, and visiting it again in the summer to cool things down.
An ERV design is based on the heat and mass exchange principles of thermodynamics. The heat exchange material in the RecoupAerator looks like a giant, square brillo pad that's about 4 inches thick and has a silver color. This material captures and holds onto the energy from the heat in the air before the air is exhausted. The captured energy, which is still being stored in the heat exchange material, is recovered and used to heat the return air before it is brought back into your home. The RecoupAerator's heat exchange material also serves as a highly efficient MERV 8 filter, making the RecoupAerator unique to other ERVs. In the summer months, the reverse is true, except that the unwanted heat is left outdoors.

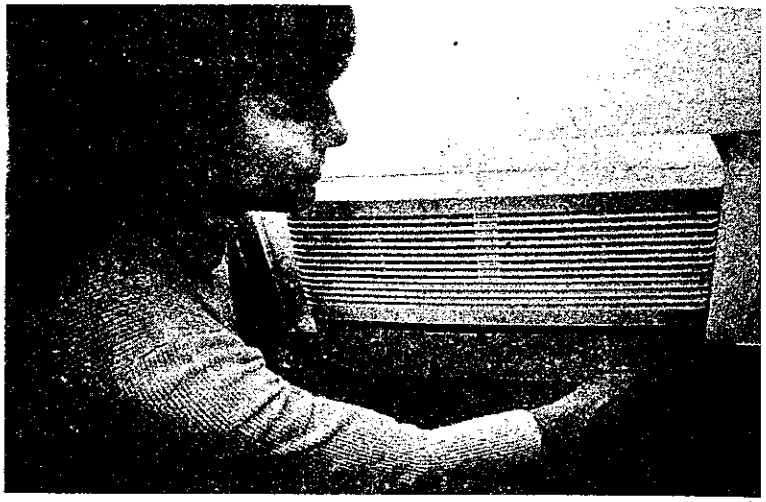
It has also been proven that, after source elimination, reducing humidity in your home can be accomplished with ventilation, according to Campagnola.

"We have tighter and tighter homes being built, but no provisions for ventilating them, so the airborne molds and the fumes from the building materials can be moved outdoors and fresh, filtered air can be enjoyed indoors," she said.

She added that in Canada, where opening a window in the winter is clearly not an option, building code requires that new homes have ventilation systems installed alongside the heating system. While all the information about IAQ is complex, ongoing and somewhat daunting, Campagnola noted that common sense and awareness can help us stay healthy. She acknowledged that most companies want to produce products that don't harm people.

"There isn't a great organized evil empire here," she said. "But there are companies that know (they make building products unhealthy for the home) and don't do anything about it," she said.

Campagnola said this is an area in which the general public needs to stay informed.



(above)
Janalee Stock, Athens City Schools nurse, turns on the *RecoupAerator* installed in her bedroom window. The *RecoupAerator* is manufactured in Athens by Stirling Technology Inc.
photo: Ed Venrick.

(cover illustration)
April Turner, an Engineer with Stirling Technology Inc. of Athens, monitors air quality from the *SD 95+ RecoupAerator.*
photo: by Ed Venrick