

The wonderful world of walls

A solar fresh-air heating system redefines energy efficiency for a business park



Walls sometimes can be an uninspiring, forgettable element of a project. Although they obviously are vital, walls don't get talked about much, particularly when discussing what makes a building energy efficient. Walls lose out to the solar reflectance and energy consumption aspects of roofs; photovoltaic systems that can be installed on roofs; low-E windows; and the glamorous features of the interior with natural daylighting, low-flow fixtures, efficient lighting and countless other sustainable options. All these aspects are important, but it's time to put the spotlight on the walls, particularly a unique option for alternative energy use.

In 2002, ATAS International Inc., Allentown, Pa., unveiled InSpire, a metal wall panel system that is a solar collector and fresh-air heating system.

"The unique system has been turning heads and gaining attention since its release," said Jim Bush, vice president of sales for ATAS. "It has won awards from trade magazines for top product, but more importantly, architects, building owners and contractors have recognized the many advantages of this system and the ease of installation combined with a rapid ROI."

Craddock Cunningham Architectural Partners, Blacksburg, Va., took notice when

designing Giles County Tenant One Wheatland Eco-Park in Pembroke, Va. Wheatland Eco-Park is a county-owned, mixed-used development for industrial, commercial, research and residential uses. The first tenant, NanoSonic Inc., moved into the business park in September. A requirement for occupation is all buildings must be LEED Certified. This was mandated to encourage green building design and development practices. But the design team didn't want to stop at just requiring something that can be called sustainable. They wanted to take the green concept even farther. Architect Michael Hedgepeth noted: "The Eco-Park concept extends beyond a sustainably designed building to include goals of interconnected uses. For example, where the by-product, or waste, from one enterprise becomes the 'feed' or other integral component to other enterprises."

This goal of interconnected use was achieved with InSpire—a wall system that combines aesthetics while capturing solar energy.

The Wall System

The concept of InSpire is to preheat outside air before it enters the building, lowering energy consumption and decreasing utility bills. But it does much more than that. It also



insulates buildings' inner walls by shielding them from direct sunlight during the summer. Furthermore, InSpire destratifies hot air treated at the ceilings, resulting in lower temperatures for air exhausted through the roof. InSpire consists of ATAS metal wall panels, fans, dampers, ducts and other ventilation components in conjunction with an electronic control system.

The system begins with the metal panels. They are available in 0.032-inch aluminum or

0.027-inch zinc. The aluminum is provided with Fluoropolymer (PVDF) coating systems in a variety of colors, whereas the zinc has pre-weathered finishes. With both materials, the sun's energy is absorbed by the panels, heating the air at the surface. Proprietary engineered perforations provide passageways for the air to move through the collector.

Installation consists of mounting the wall panels 4 to 8 inches from the outer wall of the building. Ventilation fans at the top of the wall draw the outside air through the perforations in the panels and into the wall cavity. The air is then passed into conventional ductwork of the building's ventilation system. In the summer, the system also is effective by preventing normal solar radiation from striking the building's main wall. Hot air is thermally siphoned up the wall and vented through holes at the top of the system, leaving the main wall cooler. Bypass louvers also can be used in the summer to allow fresh air to be drawn into the building, maintaining indoor air quality.

"The installation of InSpire is similar to a typical metal wall panel system," said John Van Den Elzen, sustainable building products specialist for ATAS. "No special tools or skills are needed. The panels can be installed over or around existing wall openings and over any non-combustible wall material."

Wheatland Eco-Park features about 3,630 square feet of InSpire—aluminum panels finished in Classic Bronze. They were installed on the south wall. The builder and installer was HS Williams Co., Marion, Va.

"InSpire was selected to utilize solar energy for the benefit of reducing energy consumption by the building," Hedgepeth explained. "Specifically, the ATAS wall system utilizes a very simple non-mechanical, or passive, technology to capture and share heated fresh air in the building."

InSpire reduces annual energy consumption by 1 to 2 therms per square foot of collector. It lowers annual heating costs by \$1.50 to \$5.50 per square foot of collector, depending on the fuel replaced. This results in typical paybacks of three to 12 years.

Because statistics don't mean much without proof, ATAS created InSpire Wall Performance Monitoring, an online program that gives real-time and historical performance data for an installed InSpire system. For Hedgepeth, this was a major selling point, noting, "Enough research and case study information is available from ATAS to study and document the value of the system, including an estimated return-on-investment."

Up-Fit Goals

CCAP was involved in two phases of construction at Wheatland Eco-Park. Phase one consisted of acting as the bridging architect for the pre-engineered building, and phase two was performing the tenant up-fit. Giles County Industrial Authority was involved with both phases, and CCAP worked closely with the tenant, NanoSonic, to ensure the space suited its needs. That space is a 30,000-square-foot building that is 40 percent office space and 60 percent research/lab/prototype facilities. Hedgepeth said the design goals were to create a high-quality space that

was budget conscious, while being an investment in long-term sustainability.

"To achieve these goals, inside the building, we took advantage of views and daylight, sustainable finishes, efficient fixtures and equipment, and a solar wall," Hedgepeth said. "Outside the building, the focus was directed toward water-efficient landscaping, pervious surfaces and stormwater management."

InSpire met two design goals, as well. It fit the interconnected use with its solar collector capabilities, and its metal components reflected the image of the business park. "CCAP felt that the exterior fabric of the building should suggest what is contained by that skin. This inclination influenced the use of [metal] on the building exterior as an allusion to some of NanoSonic's manufacturing processes," Hedgepeth said.

A wall panel that can do all that surely deserves the spotlight. 

Stevi Jerrold is the marketing coordinator for ATAS International Inc., Allentown, Pa. More information can be found at www.atas.com.

