



case in point

After 10 years, energy recovery still delivers for Atlanta building

Energy cost savings, plenty of fresh air, really simple maintenance, solid-gold reliability — these are the actual benefits of an energy recovery system installed 10 years ago in an Atlanta office building, according to the equipment operator. Although the energy recovery system was originally designed to improve indoor air quality, the unit has proved that it can do much more by decreasing humidity, dramatically reducing the building's cooling energy consumption, and running reliably, day after day, year after year.

"To be honest, as simple and basic as this equipment is, I don't see why it couldn't last 20 or 25 years," said David Walker, the office building's technical services manager.

ORIGINAL AIR QUALITY CONCERNS

The Eleven Hundred Peachtree Street building is 28 stories tall, with 618,000 sq ft of space. Commercial tenants occupy all floors, with about 80% of the space being occupied by building owner BellSouth and a law firm.

When the building was being constructed, indoor air quality was a concern. Tim Crawford, sales engineer, Thermal Recovery Systems (Rincon, GA), was then working as engineering manager for Rosser Fabrap International, which designed the building's hvac system.

Crawford said, "At that time, the whole design profession had been downsizing outdoor air requirements." The norm was 5 to 7 cfm per person. "But then the sick building syndrome began coming onto the scene, and occupants were beginning to experience stress-related problems resulting from relatively low levels of ventilation air," he said. Also around that time, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) introduced a new standard for ventilation air, ASHRAE 62-1989, which recommended 15 to 20 cfm per person for new buildings.

After the Eleven Hundred Peachtree project was under way, the building owner wanted to advertise that the building closely matched the new ASHRAE ventilation standard. "Originally, we designed the building for 10 cfm per person," says Crawford. "Fortunately, we were able to change the design and raise the outdoor air to about 17 cfm per person, so we brought the building into immediate compliance. The original equipment selection had relatively low air volumes for the equipment capacity, so we were able to raise the amount and pump in more outdoor air without changing the equipment selection."

ENERGY RECOVERY SYSTEM PRE-CONDITIONS OUTDOOR AIR

To increase ventilation, a total energy recovery unit was installed, a SEMCO Exclu-Sieve® system that provides 52,000 cfm of outdoor air. Each building floor has variable air flow air-handling units, and the system exhausts about 31,000 cfm of return air from the toilet areas. The SEMCO unit uses a desiccant-based energy recovery wheel to "pre-condition" ventilation air before it enters the vav air handlers, primarily by removing moisture from Atlanta's hot, humid outdoor air. The hvac system also incorporates two 800-ton Carrier electric centrifugal chillers and all-electric heating.

Carter & Associates operates the building for BellSouth and was involved in the original project development. David Walker, Carter's current technical services manager at Eleven Hundred Peachtree, says, "The reliability of the SEMCO energy recovery system has been excellent since the building



The desiccant-based energy recovery system at Eleven Hundred Peachtree Street pre-conditions ventilation air by removing the moisture before it enters the air handlers.

was built. It works as if it is still brand-new." Tim Crawford adds, "The fact that we're talking about it 10 years later indicates a large degree of reliability."

Only one problem of any significance was encountered, due to what Walker calls "a very unusual" storm. Driving rain and high winds pulled the energy wheel's filters out of the rack and damaged the wheel media. The filter rack was modified and the wheel media replaced.

Aside from this freak of nature, the energy recovery system has been easy to maintain and

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operate. Walker performs routine maintenance, which includes lubricating the wheel and fan motors, changing the filters every 120 days, and replacing the belts once a year. “That’s really all there is to taking care of the thing,” he says. “It’s simple, and the belts are very inexpensive.”

REDUCING COOLING COSTS IN AN ALL-ELECTRIC BUILDING

The SEMCO unit’s ventilation abilities, combined with moisture removal, not only improves indoor air quality but also saves energy and reduces operating costs. “It provides a much higher comfort level,” said Walker. “Because you have a tight filter media before the wheel, there’s a higher level of air filtration for the makeup air. This extends the time between filter changes on the air handlers. The building is very dust-free. It’s an exceptionally comfortable building.”

More importantly, however, “It’s a tremendous energy-saver,” he said. “It does a wonderful job of decreasing the latent load. It’s hard to imagine how much you can reduce the energy needed to cool the

building.” Ten years ago, the energy cost savings attributable to the SEMCO unit was estimated at about \$51,000 per year. For outdoor air heating and cooling by a conventional system, the estimate was \$45,500/yr vs. \$23,400/yr for a Exclu-Sieve system. Heating and cooling demand charges were calculated at \$36,200/yr for a conventional system vs. \$7,200/yr for a Exclu-Seive system. Taking these estimates into account, this indicates a cumulative operating cost savings of more than \$500,000 as of this year. Walker verifies this estimate, but says that the calculations should extend to at least 15 years of operation, if not 20, or even 25 years. “In terms of its being there and functioning, there’s no reason you couldn’t operate it for that long,” said Walker.

Currently, Carter & Associates is constructing or planning to construct three other commercial buildings and is in the process of evaluating the installation of energy recovery systems. Walker says they can be justified economically. The biggest hurdle to overcome, compared with installing a conventional makeup air system, is first cost. “You have to sit down and take the time to properly analyze the economics and look at the true life-cycle cost,” he says. “For example, could you downsize the chiller and decrease the size of the air-handling units on every floor?”

Walker points out that the Eleven Hundred Peachtree building is all-electric but requires no preheat on the air handlers and no electric strip heat for freeze protection. “This allows us to decrease the amount of electric heat required. We only heat the perimeter on the windows.” The building’s energy consumption is only about \$1.01 per gross sq ft. “That’s just excellent,” Walker says. “It’s about 10 cents less than a conventional building.” In addition, the SEMCO unit provides free humidification of outdoor air during the winter and reduces the cooling coil condensate by 1,300 lb/hr at design conditions.

In April 2000, BellSouth’s Eleven Hundred Peachtree facility received an Energy Star award from the U.S. Environmental Protection Agency, recognizing the building’s high level of energy efficiency. “We were the first high-rise in Georgia to get this award,” says Walker, “and no doubt it’s due to the SEMCO energy recovery system.” ES