RenewAire® Energy Recovery Ventilation

HUMANE SOCIETY FACILITY'S STATE-OF-THE-ART HVAC DESIGN ENHANCES ANIMAL HEALTH AND IAQ

Emphasis on outdoor air exchange with cost-saving energy recovery ventilation produces indoor air quality that rivals today's cutting-edge commercial buildings.

HIGHLIGHTS

PROJECT:

- Humane Society

LOCATION:

- Broome County (N.Y.)

INDUSTRY:

- Nonprofit organization

PRODUCT APPLICATION:

- (3) EV450 RenewAire ERVs
- (2) HE1X RenewAire ERVs
- (1) HE2X RenewAire ERV

KEY FACTS:

- IAQ prevents airborne disease transmission among animals
- Animals are healthier and happier with better IAQ
- Energy recovery reduces costs of conditioning the building
- Odors are greatly reduced with 100% outdoor air
- Independent systems in isolation rooms prevents the spread of disease

The Humane Society of Broome County, N.Y.

OVERVIEW

Dog and cat inhabitants in the new 12,000-square-foot Broome County (N.Y.) Humane Society (BCHS) facility are getting the same indoor air quality (IAQ) that humans breathe in modern office, healthcare, education and other commercial environments, thanks to a state-of-the-art HVAC design. The facility's IAQ equipment has significantly minimized odors and infectious airborne contaminants associated with many animal facilities. Instead, the BCHS has become a role model of HVAC design that other animal shelters are visiting to solve their own IAQ challenges.

Versus the previous building's HVAC, the new BCHS facility's IAQ design results in healthier animals that are far less likely to contract communicable illnesses, according to Karen Matson, BCHS's executive director.

The HVAC design emphasizes isolating several rooms with their own self-contained 100-percent outdoor air energy recovery ventilators (ERV) to supplement conventional rooftop unit (RTU) HVAC systems.

Like humans, reducing indoor CO2 levels helps make animals feel better, thus they're living happier lives, according to Matson. Effective IAQ helps employees too. CO2 and other airborne contaminants decrease employee cognitive functions and productivity when levels surpass 1,000-ppm in workplaces, according to a 2015 study by the Harvard T.H. Chan School of Public Health, Boston. The study used human subjects; however experts speculate a high CO2 accumulation most likely has similar effects on the well-being of animals.

VENTILATION CHALLENGES

The HVAC system was designed by consulting engineer firm, Keystone Associates Architects, Engineers and Surveyors LLC., Binghamton, N.Y., and Edward Sibert, senior sales engineer, Carrier Enterprises Northeast, Syracuse, N.Y., a joint-venture of Carrier Corp. and Watsco. Also instrumental in the outdoor air calculations was Robert Mott, sales professional, Stamberger-Sender Associates, Ovid, N.Y., a manufacturer's representative for RenewAire, Waunakee, Wis., the project's ventilation equipment supplier. The facility uses two 7.5-ton Carrier RTUs in conjunction with the RenewAire ERVs and one 5-ton split-system for the second level offices.

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-- KAREN MATSON, BCHS'S EXECUTIVE DIRECTOR WHO OVERSAW THE NEW FACILITY'S DESIGN TEAM

The non-profit, 103-year-old organization's cutting-edge building, is decidedly different than its last facility, a former 6,000-square-foot trucking garage with half the animal capacity. Donated in the 1940s, the facility was sporadically retrofitted over the decades with a hodge-podge of residential HVAC equipment, such as furnaces, window air conditioners, small ducted split systems and one ductless mini-split for cooling. Temperatures were adequate for animal comfort; however the structure's intended design prevented any kind of IAQ measures other than operating exhaust fans originally installed to remove vehicle emissions. The shelter was sanitized to standards, however the residential equipment's inability for fresh air exchange didn't adequately remove animal odors expected from housing upwards of 100 animals. "The new building has twice as many animals, but still smells 100-percent better than the old building," said David Birtch, vice president, Downstate Fabricating Heating & Cooling, Binghamton, N.Y., which installed all the HVAC equipment and ductwork.

"We definitely wanted better air exchange in the new building, but energy recovery was equally important to reduce the cost of cooling or heating the significantly larger amounts of outdoor air we needed for optimum IAQ," said Matson, who oversaw the new facility's design team.

Animal shelters need a variety of separate rooms with their own self-contained HVAC systems to prevent sick animals from infecting the general population. Furthermore, the rooms need 100-percent outdoor air exchange and a negative room pressure that exhausts more air than what's supplied, versus pushing it into adjacent spaces. BCHS's new building has dog and cat isolation rooms, plus two intake areas and the veterinarian suites are also isolated with separate ERV systems that change out 100-percent of the air with nine air changes/hr., which falls within the six to 12 air changes/hr, recommended by the Humane Society of the United States' *Shelter Design* manual.

The Humane Society of Broome County, N.Y.

RENEWAIRE SOLUTION

Installation of RenewAire ERV at Broome County (N.Y.) Humane Society

Separate HVAC designs have been instrumental in improving animal health. Furthermore, they prevent illnesses or at the least, shorten their duration, according to Matson. The previous building had isolation areas, but all rooms shared recirculating ventilation systems.

"A STATIC CORE IS A SIMPLER HUMIDITY CONTROL PROCESS TO APPLY AND MAINTAIN VERSUS ENTHALPY WHEELS. VERSUS ENTHALPY WHEELS, STATIC CORES HAVE NO MOVING PARTS, ARE EASIER TO MAINTAIN, DON'T HAVE ISSUES WITH PRE-HEAT, DEFROST AND CROSS-CONTAMINATION, THE LATTER WHICH IS CRITICAL FOR ISOLATION AREAS IN HUMANE SOCIETY WARDS."

-- EDWARD SIBERT, SENIOR SALES ENGINEER, CARRIER ENTERPRISES NORTHEAST, SYRACUSE, N.Y.

The key to the facility's 100-percent outdoor air strategy is three EV450 (300 to 400-cfm), two HE1X (450 to 550-cfm) and one HE2X (2,000-cfm) energy recovery ventilators (ERV) manufactured by RenewAire. All ERVs are stand-alone ducted systems that use a proprietary, AHRI-certified static plate core for heat recovery and humidity control. Before exhausting air returned from the spaces, the ERVs recover energy from it to efficiently heat or cool incoming outdoor air through a thermal exchange via the static core process, but without cross contaminating it. Downstate fabricated the RTU plenums, which transition into 12 to 20-inch-diameter spiral metal duct for air distribution to the respective rooms and areas.

"A static core is a simpler humidity control process to apply and maintain versus enthalpy wheels," said Sibert. "Versus enthalpy wheels, static cores have no moving parts, are easier to maintain, don't have issues with pre-heat, defrost and cross-contamination, the latter which is critical for isolation areas in humane society wards."

THE RESULTS

The kennel areas are efficiently heated with infrared heaters and the ERVs include electric heaters in the supply to provide neutral tempered air at approximately 68°F.

The BCHS building, which was funded through a capital campaign, a mortgage and newly-introduced revenue-generating services, has been visited by a half-dozen similar shelter organizations looking to improve their IAQ and animal environmental health challenges.

Proving that animal and human environments share similar IAQ requirements, Sibert used a comparable RTU and ERV design at a family health clinic in Cortland, N.Y., soon after the BCHS was completed.

Karen Matson, executive director of Broome County Humane Society

Installation of RenewAire ERV at Broome County (N.Y.) Humane Society

For more than 35 years, RenewAire®, Waunakee, Wis., has been an HVAC industry pioneer for improving human health, cognitive function, productivity and wellbeing by enhancing indoor air quality (IAQ) via energy recovery ventilation (ERV) technologies. This is accomplished energy-efficiently, cost-effectively and sustainably with fifth generation static plate enthalpy core energy recovery ventilators and dedicated outdoor air systems (DOAS).

RenewAire was recently recognized as a Top Workplace–2019 by the Wisconsin State Journal newspaper for providing an optimum employee environment, which is conditioned with (IAQ) by its own DOAS and ERV equipment. For more information, visit www.renewaire.com, email: marketing@renewaire.com or call (800) 627-4499.