RenewAire® Energy Recovery Ventilation

RENEWAIRE ERV IS AT CORE OF HIGH-PERFORMANCE, ENERGY-EFFICIENT HOME IN ATLANTA

ERV enhances indoor air quality while maximizing sustainability in ventilation

Ranch-Style Redux house once renovations were completed in August 2014
Image courtesy of Robert M. Cain, FAIA, LEED AP (taken by: Fredrik Brauer)

OVERVIEW

As the founder of Coastal Geo Exchange, a leading geothermal HVAC consultant, Don Easson, PE, CGD, works with homeowners and architects in South Carolina and Georgia to design and build systems for airtight, high-performance homes. Easson engineers the whole HVAC system, and because the houses are so well insulated, a key component is enhancing indoor air quality through ventilation. To do this in a sustainable manner that reduces both energy use and costs, Easson has been using RenewAire Energy Recovery Ventilators (ERVs) since 2008.

"I learned about RenewAire ERVs at a training session over seven years ago and I've been using them ever since with much success," said Easson, who studied engineering at the Massachusetts Institute of Technology (MIT). "In that time, I've installed RenewAire ERVs in more than 20 projects and I only have great things to say about the systems."

One of those projects is the Ranch-Style Redux house in Atlanta, Georgia that was completed in August 2014. It was a whole-house renovation and addition to a 1950s ranch-style home encompassing 2,200 square feet, and the owner, Don Hoyt, wanted to remain true to the ranch's roots, while at the same time adapting to current trends. He hired architect Robert M. Cain, FAIA, LEED AP, to design the house in this style with a focus on sustainability, energy efficiency and clean indoor air.

VENTILATION CHALLENGES

As buildings and homes become more airtight, the need for effective ventilation is increasingly important – especially since Americans spend, on average, 90% of their time indoors. Without proper ventilation, internally generated contaminants build up and cause poor indoor air quality, resulting in serious health problems. In fact, the Environmental Protection Agency ranks indoor air pollutants among the top-five environmental risks to public health.

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Indoor-air contaminants are plentiful and come from different places. These contaminants consist of dust mites, mold, humidity, asbestos, carbon dioxide, radon and other toxic gases and vapors, to name a few. Their origins are varied, but many of them are off-gassed from sources inside a home or building, such as construction materials, furniture, fabrics, carpets, cleaning supplies and even indoor occupants, among others.

The Ranch-Style Redux house was at particular risk for generating poor indoor air because of its superior insulation, so Easson had to find a way to properly ventilate the house, while meeting stringent energy-use requirements and maintaining comfortable indoor temperatures and humidity. This would all have to be achieved under both the EarthCraft and ASHRAE Standard 62.2 strict ventilation guidelines for residential energy efficiency.

RENEWAIRE SOLUTION

Easson had already decided to use a RenewAire ERV for the ventilation of the house, "There are other options out there, but I choose RenewAire ERVs because they are highly rated for energy efficiency, have superior quality, are easy to install and maintain and I've never had any problems in the seven years I've used them," he said.

Specifically, Easson cited the following reasons for why he chooses RenewAire ERVs:

- **Highly rated:** RenewAire's residential ERVs are all highly rated and certified by the Home Ventilating Institute (HVI); out of the 380 ERV/HRV models in the HVI Directory, seven out of eight RenewAire ERVs rank in the top 20
- **Optimized energy efficiency:** Utilizing fifth-generation technology, RenewAire ERVs keep airstreams physically separate while heat and humidity that would otherwise be wasted pass efficiently from one airstream to the other
- **Enhanced indoor air quality:** The ERVs replace stale indoor air with fresh, conditioned air from the outside
- **Superior quality:** The high quality of the products means they will last for a long time and will hardly break down
- **Load reduction:** The ERVs reduce heating and cooling loads, which cuts down on energy use and costs
- **Reliable:** The ERVs always work as they should and never present any problems

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- **Minimal noise:** Noise is never an issue with the ERVs since they run extremely quietly
- **Easy to install and maintain:** The ERVs are designed for easy installation and maintenance
- **Simple to use:** Homeowners like the ERVs because the controls are simple and intuitive, and provide different operation options
- **Moderation of temperatures and humidity:** Comfortable temperatures and humidity levels are continuously maintained by the ERVs
- **Excellent customer support:** The RenewAire customer-service team is always available to help out
- **No problems:** After years of using the ERVs, Easson hasn't had a single problem or complaint
- **All this at a low cost:** Already competitively priced, the ERVs will pay for themselves quickly due to energy and equipment savings

Having already selected RenewAire, the next step was to decide on the model, as well as how the geothermal HVAC system would be set up. Easson chose the RenewAire EV200 since the airflow range matched the project ventilation requirement. In terms of the HVAC system, Easson installed geothermal heat pumps and decided to place the ERV in the crawl space of the basement.

The ERV pulls stale air from the two main bathrooms and two powder rooms, and replaces it with fresh, conditioned outdoor air to provide a comfortable and clean indoor-air environment for the entire house. The total airflow is 130 CFM and is adjusted to meet strict energy-use requirements. A percentage timer was used to regulate the ventilation process, as well as push-button devices to allow the homeowner to ventilate when needed.

Images courtesy of Don Easson, PE, CGD

"THIS IS THE MOST COMFORTABLE HOUSE I'VE EVER LIVED IN. THE TEMPERATURE, THE HUMIDITY, THE AIR QUALITY – ALL ARE HEAD AND SHOULDERS ABOVE ANYTHING ELSE I'VE EVER EXPERIENCED."

-- DON HOYT (HOMEOWNER)

RESULTS

The house received third-party validation as a high-performance, energy-efficient home. It was certified by EarthCraft, a green-building certification program in the Southeastern U.S., as a "healthy, comfortable home that reduces utility bills and protects the environment." The house also meets the strict guidelines for ventilation and acceptable indoor air quality in residential buildings set forth by ASHRAE Standard 62.2. Both of these achievements would've been impossible without the ERV.

From the owner's perspective, Don Hoyt stated, "This is the most comfortable house I've ever lived in. The temperature, the humidity, the air quality – all are head and shoulders above anything else I've ever experienced." The ERV is at the center of making the house this comfortable by enhancing the indoor air quality and maintaining steady temperatures and humidity.

Hoyt continued and discussed the use of the ERV, "Having that regular inflow of fresh air from the ERV makes a big difference in the quality of the indoor environment," he said. "The heat transfer that takes place in the ERV reduces energy usage, especially when there's a big differential between the indoor and outdoor temperatures."

The ERV also helped to lower energy costs by reducing loads and it saved time that would otherwise be spent on maintenance. Hoyt said, "Because we no longer have any natural gas bills, we're saving a reasonable sum compared to our previous overall utility costs." In terms of maintenance, he asserted, "The ERV is very well-designed. Access to, and cleaning the filters, for instance, is simple and straightforward."

Further, the ERV contributes to keeping the house's energy use more even throughout the year. Hoyt said, "I looked up our power usage in the old house and the one thing that stands out is that there was a huge peak in summer usage – almost a bell curve," he said. "With the new system, usage is much more level."

From the engineer's perspective, Don Easson is happy because his client is content. "Everything involving the RenewAire ERV has been trouble-free – easy installation, easy to use and easy to maintain," he said. Also, going forward, the only work required is simple upkeep of the ERV, "The minimal maintenance required is to change the filters every 2-3 months – that's it!"

From the architect's perspective, Robert M. Cain was pleased with the overall use of the ERV and its performance, "What I like most about the RenewAire ERV is its reliability and ease of maintenance," said Cain. "The ERV contributes to making the house a high-performance, energy-efficient one because it allows us to economically recover invested energy. We hate to throw away conditioned air."

NEXT STEPS

What's next for RenewAire ERVs and for everyone involved in the Ranch-Style Redux house? Easson has five upcoming high-performance residential projects that will incorporate the ERVs. "I would definitely recommend RenewAire ERVs for similar renovation projects that want to create a comfortable indoor environment, while optimizing energy efficiency," he said.

For both Hoyt and Cain, RenewAire ERVs will play key roles for each of them going forward. Hoyt isn't looking back when he says, "We are living much more comfortably than we did in the old house." Cain plans to use the ERVs in several upcoming projects, "We have one in a large house currently under construction and two on the boards," he said. "I would definitely recommend RenewAire ERVs."

"THE RANCH-STYLE REDUX HAS IT ALL – ENERGY CONSERVATION, TIGHT INSULATION, GEOTHERMAL HEAT AND A CERTIFIED RENEWAIRE ERV AT ITS CORE. IT'S THE WHOLE PACKAGE, AND THE ERV IS AN INTEGRAL PART OF MAKING THIS A HIGH-PERFORMANCE HOME."

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IN SUM

The Ranch-Style Redux house was reborn as a high-performance, energy-efficient home with the RenewAire ERV at its core enhancing indoor air quality and maximizing sustainability as it creates a comfortable living environment. The engineer, architect and homeowner all agree that the ERV has done a tremendous job, and all of them would recommend RenewAire for similar projects.

Easson summed up the project and role of the RenewAire ERV well when he concluded, "The Ranch-Style Redux has it all – energy conservation, tight insulation, geothermal heat and a certified RenewAire ERV at its core. It's the whole package, and the ERV is an integral part of making this a high-performance home."

For over 30 years, RenewAire has been a pioneer in enhancing indoor air quality in commercial and residential buildings of all sizes. This is achieved while maximizing sustainability through fifth-generation, enthalpic-core, static-plate Energy Recovery Ventilators (ERVs) that optimize energy efficiency, reduce electrical loads and are made in the USA – all at a low cost to our customers. For more information, visit: www.renewaire.com.