

RenewAire Case Study: Birdville High School

The Education of North Richland Hills, Texas

The city of North Richland Hills lies just between Dallas and Fort Worth. The population is almost 60,000 and growing. Fast. In fact, the city has almost doubled its population since 1980.



North Richland Hills celebrates their 50th anniversary this year and they have a number of accomplishments to which they can point with pride. For example, they have 17 schools and 20,000 students in the Birdville Independent School District (BISD). And Birdville High School (BHS), built in 1998, is one of the largest single buildings in the country using geothermal heating and cooling systems with RenewAire Energy Recovery Ventilation (ERV).

An engineer with straight A's

Building a school poses some special challenges. The Birdville School district was pretty clear in what they wanted. As usual, cost was a big consideration. But there was also 301,000 square feet of space with different uses besides classrooms. BHS also houses science labs, an auditorium, a gym and an atrium. Not to mention 1100 students and staff. Sound quality was an issue, as well as air quality. And the tax-funded school district required an environmentally friendly geothermal system.

This project needed an engineer with special skills and a proven track record, so they chose Don Penn Consulting Engineers to do the system design. Don has a list of impressive credentials including being the only engineer registered in all 50 states. His firm has an entire group that works only on schools. They had exactly the expertise BISD needed.

Multiple Choice

Don Penn started with a closed-loop, geothermal system from Trane. And when it came to adding a ventilation system to the Trane equipment, they had a number of good reasons for choosing an energy recovery ventilator (ERV) from RenewAire.

RenewAire's ERV brings fresh air into the school through an exchange core made of highly-engineered resin plates. Through this core, heat and moisture are transferred to the stale air being exhausted, effectively pre-conditioning the fresh air going to the heat-pump system.

An informal survey of maintenance engineers in schools and their own, direct experiences told Don that what they needed was "a better mousetrap" for BHS. And that's what RenewAire's ERV, combined with the Trane geothermal system, provided.



As far as costs go, Penn says this system was absolutely the right choice. "The payback analysis was negative years based on the original Central Plant System. The school is operating at 40% less energy costs than other, similar non-geo campuses. The geo system was installed within the budget of the Central Plant."

Will this be on the final exam?

RenewAire's ERV provided very clear benefits to Don Penn Consulting Engineers when they were designing the HVAC system for Birdville High School:

- Pre-conditioning fresh air dramatically reduces energy costs. It can cool 100° air to 80°. The cooling system only has to cool the air another 10° on the hottest of days.
- The RenewAire core has no moving parts, making it quiet for classrooms and other areas that require superior acoustics
- The simplicity of the static-plate core also means far less maintenance and a prolonged lifecycle for the equipment, which reduces the real cost of the system. A rotating wheel can double its original price tag over 10 years when you add in maintenance costs.
- Bringing in fresh air vastly improves air quality for students and staff who are often grouped together in small, closed areas such as classrooms. And fresh air also helps with the health concerns involved when you are dealing with kids.
- You don't need to start from scratch to realize the benefits of an ERV. RenewAire's ERV works equally well when you are upgrading or retrofitting a current system as it does in new construction.

Lessons Learned

Birdville High School's success story has drawn a lot of attention across the country. Innovative design, the right equipment perfectly matched for the job, and the support of a progressive school district, all combined to provide excellent air and sound quality and remarkable cost efficiency. The project has been awarded for Outstanding Use of Technology Systems by the National School Boards Association. Since its completion, several other schools have used the same technology with RenewAire ERVs, including 3 schools in the Frisco Independent School District in Texas. In fact, the Frisco ISD has committed to using geo and RenewAire at all their campuses.



“We consistently see a 25-30% reduction in energy costs” with this system, said Penn. It's friendly to the environment, friendly to users and pays off every time you use it.

Report Card

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| • Design Student occupancy | 2200 |
| • RenewAire ERV units | 105 |
| • Heat pump/ERV unit ratio | 2.3 |
| • Total ventilation rate | 75,000 CFM |
| • Total A/C capacity | 1,000 tons |
| • Ventilation A/C demand w/o RenewAire | 300 tons |
| • Ventilation A/C demand w. RenewAire | 175 tons |
| • A/C downsizing w. RenewAire | 125 tons |
| • Rebates, incentives? | None. Just the energy savings. |