



Rogers Public School District updated the HVAC systems in three elementary schools, serving over 2,000 students and staff.

## Daikin Rebel HVAC System with CORE Heat Exchanger, Plus VAV and VRV Technologies Provide Cost-Effective Cooling

### CHALLENGE:

Keeping students focused in the classroom can be a daunting challenge, especially at the K-12 level. There is a myriad of distractions with which to contend...from the social scene, to pending athletic events, and to what is going on at home. A comfortable learning environment, expressed in terms of humidity, temperature, noise, and air quality, is essential. Comfortable students are more alert and engaged...and that leads to learning and achievement.

The Rogers School District is proactive when it comes to ensuring the quality and efficacy of its educational infrastructure...especially as it relates to the safety and comfort of students and staff. Accordingly, it elected to replace the HVAC systems at three of its elementary schools as part of a planned replacement and upgrade. The elementary schools included: Lowell, Westside, and Northside. The retrofit would help solve ongoing humidity problems, but also help avoid the interruptions normally associated with aging HVAC systems, like increased maintenance and random failures. To start the process, the Director of Facilities, Dan Caley, reached out to Harrison Energy Partners and Daikin Applied for a solution.

### SOLUTION:

The initial outlay for an optimized HVAC system equipment is just one component in its overall cost. Longer term, the cost of maintenance and energy are significant cost factors as well. Together, these lifecycle costs can be significant. Yet, with the help of the school's hired design consultants and Harrison Energy Partners, Dan Caley formulated a solution featuring the highest efficiency RTU in the market, in tandem with a premier efficiency VRV system product. He elected to treat the classroom outside air loads with Daikin Rebels, featuring CORE heat exchangers. Daikin variable refrigerant volume (VRV) systems are used to treat both classroom and office space sensible loads. Larger spaces such as cafeterias and gyms are served by single zone, variable air volume (SZVAV) Daikin Rebel units with dehumidification control.

**NAME:**

Rogers Public Schools

**LOCATION:**

Rogers, AR, USA

**AREA SERVED:**

165,000 square feet

**CHALLENGE:**

Solve ongoing humidity problems and aging HVAC infrastructure with a Daikin Applied retrofit

**SOLUTION:**

Daikin Rebels with CORE heat exchangers, single zone VAV Rebels and Daikin VRV technology

## SOLUTION (CONTINUED):

The systems for each school feature two innovative, energy saving technologies that, while initially more costly, return significant long-term energy savings that far outweigh the initial outlays. One of these technologies is referred to as energy recovery or “free energy.” The second is variable speed technology.

For these projects, Daikin’s CORE heat exchanger was chosen over the more typical wheel technology, given it requires less maintenance. Like the wheel, cleaning maintenance is still required. Yet, there are no belts and motors that can fail over time, i.e., no moving parts. Using CORE technology, exhaust air is used to pre-heat the outside air in the winter and pre-cool the outside air in the summer. The CORE technology system reduces the energy needed by compressors while also reducing heat energy in the form of oil, gas, or electricity.

The second Daikin innovation applied to two products on these projects is variable speed compressor technology. Both the Daikin Applied Rebel packaged units and the Daikin North America

VRV systems use inverter driven compressors to precisely match the cooling load required by the systems. The dedicated outside air units (Daikin Rebel) pair the inverter compressor technology with hot gas reheat dehumidification coils to supply dry outside air at room temperature. The Daikin VRV units take over from there to tackle the room sensible loads generated by the lights, solar load, and students in the space. This technology circulates only the minimum amount of refrigerant needed at any one time and enables individual climate control of air conditioning zones, such as classrooms—that means lower energy use. This system also yields less noise and a lower carbon footprint compared to your standard split system and packaged classroom units. “You can barely hear the system running...and everything is contained within the ceiling,” noted Dan Caley, Director of Facilities for the Rogers School District. “The side benefit is we have recaptured extra space within the classroom because we can use the utility closet space for other purposes.”

## OUTCOME:

The Rogers School District is extremely happy with the performance of the new system. It will be able to evaluate energy savings more precisely with another year of operation. Yet, the new system is already showing reduced energy consumption. “Everything has worked out exceedingly well...

and all those complaints about humidity have gone away,” said Dan Caley. Moreover, the Rogers School District has asked Dan and his facilities staff to apply Daikin VRV and energy recovery systems (CORE) units on future school HVAC retrofit projects.



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– Dan Caley, Director of Facilities, Rogers School



Producing an astounding 20.6 IEER and up to 43% energy savings compared to ASHRAE’s 90.1 energy standard, Rebel generates efficiencies previously unachievable in a commercial rooftop system.

