Dallas-Fort Worth Area School District Achieves Energy Efficiency and Comfort with Daikin VRV® System

The Challenge

A multi-purpose Texas school district facility, which includes a computer training center, presented heating and cooling challenges demanding an innovative solution.

Daikin's Solution

Daikin's VRV® Heat Recovery System, which can simultaneously and effectively heat and cool in different zones. The result is optimum comfort and quiet for the building's occupants.

Application:
School

Location:
Haltom City, Texas

With the heating and air conditioning equipment in the Birdville Independent School District's Shannon Learning Center in Texas nearing the end of its life expectancy, the district's systems administrator and its consulting engineering firm, Image Engineering Group Ltd., decided to go for an innovative approach.

The Birdville district decided to replace the existing inefficient HVAC equipment with an advanced Daikin VRV® (Variable Refrigerant Volume) system providing simultaneous heating and cooling in different zones, heat recovery from one zone to another, and individualized comfort control. The VRV system adjusts the volume or flow rate of the refrigerant to the cooling or heating demands of each zone it controls so no energy is wasted yet all demands are met.

The first VRV technology used in the school district – now fully operational, the administrator, Bill Barrow, is very pleased. "It's

Daikin's VRV Heat Recovery system which allows simultaneous heating and cooling was chosen to replace decades-old HVAC system in the Shannon Learning Center.

working exactly as we were told it would," he said. "It's quiet, it's efficient, and the people in the building say they are a lot more comfortable than they used to be."

Barrow and Robert Frick, a senior project manager with Image Engineering in Grapevine, Texas, agreed it was time to test the extremely efficient VRV technology at the school district, which spans 40 miles and includes five cities in the Dallas-Fort Worth Metroplex, with 32 campuses within its boundaries serving 22,400 students. "We're very familiar with this technology and have been looking for an application in our district where its implementation made sense. Since it's been installed, we've had good results with it and we're looking for other retrofit applications," Frick said. "It's proven technology used all over the world and we thought it was time to bring it to the Birdville district."

Challenging Spaces

The Shannon Learning Center, based in Haltom City, was originally a high school built many decades ago and was re-purposed in the 1980s as a combination administrative building, site for technology training, and home to an alternative high school program. The facility's first conventional HVAC system comprised of fan coil units located in the hallway which provided conditioned air to the classrooms. It was later replaced with a ductless split system. Neither performed particularly well in the sweltering Texas heat according to Barrow; in the case of the ductless splits, it was because they were undersized in terms of capacity, he said.

When the decision was made to replace the existing system, Barrow and Frick thought a Daikin VRV Heat Recovery system, which allows for individual control of up to 41 indoor fan coil units on one refrigerant circuit, would be the perfect fit for this application.

"We were impressed with the system's ability to move the heat around the facility as needed. These are challenging spaces to

"It's quiet, it's efficient, and the people in the building say they are a lot more comfortable than they used to be."

Bill Barrow , Birdville Independent School District

The heart of the Shannon Learning Center's new HVAC system comprises two Daikin outdoor inverter-driven 6-ton REYQ heat recovery units and one 8-ton unit. VRV systems adjust the volume or flow rate of the refrigerant to the cooling or heating demands of each zone it controls so no energy is wasted yet all demands are met.

heat and cool, especially the computer training spaces with heat-generating equipment," Frick explained. "There are times of the year where we have a high heat load on the inside of the building which requires air conditioning, while other spaces need heating. The heat recovery technology addresses this situation and let's us do both things simultaneously."

The Shannon Learning Center HVAC system is made up of two Daikin outdoor inverter-driven 6-ton REYQ heat recovery units and one 8-ton unit, with nine FXFQ 4-way ceiling-mounted cassette units using non-ozone-depleting potential R-410A refrigerant. Occupants use nine simplified controllers, which allow them to orchestrate and monitor temperature, time, and air flow volume in each zone. An interface unit allows for communication with Birdville's BACnet® system, which is the protocol for building automation and control networks within the facility.

Birdville brought in HVAC contractor Hawk Plumbing, Heating and Air Conditioning Inc., Fort Worth, Texas to handle the installation. Although it was the contractor's first foray with an inverter-driven VRV system, all went well, according to Ronald Hawk, president and owner. "This was our first Daikin job, but

Bill Barrow, of the Birdville Independent School District gives a number of reasons why he felt the Daikin VRV system was a good fit for his school.

- **It was an easy retrofit.** "*We were able to use existing equipment to provide conditioned air while we were installing the new equipment, so there was minimum disruption during the installation," he said.*

- **No electrical system upgrade was needed.** *"The electrical requirements of the Daikin system did not require a major change," he noted.*

- **The system is more energy-efficient.** *The savings resulting from the VRV system at the Shannon Center may be difficult to quantify on paper because it comprises a small portion of a much bigger system. However, Image Engineering's Frick said during the planning stages, they estimated a 20% savings would be realized with the new equipment. "I just know it's doing a much better job keeping our people comfortable," Barrow declared.*

- **An extended life cycle is anticipated.** *Studies show VRV systems like these routinely run many years without major problems, such as the need for compressor replacement. Daikin's VRV consistently operates over 20 years under various climate conditions. Birdville Independent School District is expecting the same good results.*

- **The quiet operation is essential.** *"It is absolutely the quietest," Barrow said. "Studies have shown students learn better in a quieter environment and this system certainly provides that."*

Among the reasons why the Birdville (TX) Independent School District chose the Daikin VRV® Heat Recovery system was the heating and cooling challenges presented by a multi-purpose facility included a computer training center. The 4-way ceiling-mounted cassette unit (left) delivers conditioned air at the right temperature to the busy space full of heat generating computer equipment.

after receiving training on the system, we got it done correctly and with no problems," he said. "It was easy to install. The piping system was different than what we normally handle, but not complicated." Hawk acknowledged the valuable training assistance he received from sales representative, Texas Air Systems' Glen Brunkenhoefer and Daikin.

Barrow said he's glad the school district has taken the step toward newer, more energy-efficient technology with the installation of the Daikin VRV system. "We're very pleased with the Daikin system and glad we took an alternative approach for the Shannon Learning Center. It's one that will benefit the school district for years to come," he said.

"There are times of the year where we have a high heat load on the inside of the building which requires air conditioning, while other spaces need heating. The heat recovery technology addresses this situation and lets us do both simultaneously."

Robert Frick,
Image Engineering

Additional Information

Location

Shannon Learning Center
Birdville Independent School District
Haltom City, Texas

Contact Information

Manufacturer
Daikin AC
Christina Trondsen
1645 Wallace Drive, Ste. 110
Carrollton, TX 75006
www.daikinac.com
972-245-1510
christina.trondsen@daikinac.com

HVAC Contractor
Hawk Plumbing, Heating & Air Conditioning Inc.
Ronald Hawk
8506 Spring Street
Fort Worth, TX 76179
817-236-8483
www.hawkphac.com

Owner Facility Manager
Shannon Learning Center
Bill Barrow
6010 Walker Street
Haltom City, TX 76117
817-547-5400
Bill_barrow@birdville.k12.tx.us

Consulting Engineer
Image Engineering Ltd.
Robert Frick
635 Westport Parkway, Suite 300
Grapevine, TX 76051
817-410-2858
rfrick@iegltd.com

Manufacturers Representative
Texas Air Systems Inc.
Gene Hensarling
2951 Northern Cross Blvd., Suite 201
Fort Worth, TX 76137
817-838-7400
geneh@texasairsystems.com

Product Profile
Daikin Equipment

Daikin Product Profile

(2)	REYQ72MTJU	Heat Recovery 72KBtu/h
(1)	REYQ96MTJU	Heat Recovery 96KBtu/h
(6)	FXFQ30MVJU	4-Way Ceiling Cassette 36KBtu/h
(3)	FXFQ36MVJU	4-Way Ceiling Cassette 30KBtu/h
(2)	KHRP25M33T	Pipe REFNET Joint
(2)	KHRP25M72T	Pipe REFNET Joint
(3)	KHRP26M22T	Pipe REFNET Joint
(1)	DMS502A71	Interface for Use in BACnet
(9)	BRC2A71	Simplified Wired Controller

About Daikin AC

Daikin AC offers North America intelligent heating and cooling solutions with superior energy performance and sophisticated design. These advanced systems fall under the Daikin Altherma, Quaternity™, VRV®, VRV-S® and SkyAir product names. The company located in Carrollton, Texas, is owned by the Japanese-based Daikin Industries, Ltd. For more information, call 866-4DAIKIN or visit www.daikinac.com.