



In addition to college activities, NSU's event center hosts a variety of community events—all of which require enhanced air, temperature, and humidity control.

## CASE STUDY

### Higher Education

#### Name

Northeastern State University Multipurpose Event Center

#### Location

Tahlequah, OK, USA

#### Facility size

78,200 ft<sup>2</sup>

#### Issue

Economical HVAC operation with zone control for multiple-use event and athletic center

#### Solution

(2) 79-ton Roofpak®, (1) 15-ton Maverick® II, (2) 10-ton model DC Daikin rooftop systems, (4) Daikin VRV systems

## Daikin Energy-saving HVAC Lowers Operating Costs for Campus Event Center at Oklahoma's Northeastern State University

### Issue

HVAC at Northeastern State University's (NSU) new Multipurpose Event Center outside of Tulsa, OK needed to satisfy the occasional high-occupancy requirements of an event and athletic center while providing daily back-of-house functionality. In addition to an auditorium/arena, the event center houses athletic offices, locker rooms, the NSU team store, concessions and meeting space.

"We have a good relationship with the consulting engineer. We considered packaged systems with VAV boxes and hydronic systems with fan coils before arriving at the hybrid solution," said Chad Smith, vice president at Airetech Corporation in Tulsa, Daikin manufacturer's representative. When a traditional four-pipe system was not economical enough, a hybrid of Daikin equipment became the basis of design.

### Solution

The main event space is served by two Daikin 79-ton ground-mounted RoofPak systems. The dual RoofPaks condition the arena by modulating the outside air to meet the ventilation requirements of the occupancy level during events. Spaces like the athletic offices, locker rooms, and meeting spaces required individual zone control.



Daikin 79-ton RoofPak

"To maintain temperatures in the smaller back-of-house spaces, we used Daikin VRV (variable refrigerant volume) equipment to provide a distributed system with individual zone control. We chose the VRV systems as a multi-zone air conditioning system to satisfy the need for thermostatic control throughout these spaces and to help save energy,"

said Duane Harman, P.E., mechanical engineer in Tulsa, the consulting engineer on the project.



Daikin 15-ton Maverick II

A 15-ton ground-mounted Maverick system serves the locker rooms. Both the RoofPak units and single Maverick system that serves the arena space and locker rooms, respectively, were customized with energy recovery wheels that allow for variable air volume (VAV). "We designated energy

recovery ventilators on the rooftop units that serve the arena and locker rooms to further reduce the overall compressor loads on the building and to conserve energy," Harman said.

Four VRV systems incorporate fan coil units to serve remaining building spaces. The NSU event center officially opened in November 2013, followed by final commissioning of the HVAC systems in January 2014. A second construction phase has since added 3,000 sq. ft. of meeting space, supplemented by two roof-mounted 10-ton packaged Daikin rooftop units with constant air volume.



Daikin VRV systems

### Outcome

This mix of hybrid Daikin equipment at the NSU center allows the university to minimize ongoing operating costs with energy-saving equipment. "Because of the VRV systems in place at the NSU event center, people in those spaces have the ability to control their own space temperatures, bringing more flexibility for occupant comfort and based on usage of each space," Harman concluded.