



Overland Park, Kansas

JOHNSON COUNTY COMMUNITY COLLEGE: GALILEO'S PAVILION

CHALLENGE

Selecting a super-efficient HVAC system for an academic building designed to showcase sustainability

SOLUTION

Variable Refrigerant Flow (VRF) technology from Mitsubishi Electric

RESULT

LEED® Platinum certification, comfortable classrooms and a proud community



Johnson County Community College (JCCC), Overland Park, Kansas, serves about 20,000 students. In 2009, the school formed the Center for Sustainability to promote an environmentally, socially and economically responsible campus. The Center set goals, including becoming a zero-waste-to-landfill campus by 2025 and a 100 percent renewable energy campus by 2050. This commitment to sustainability has affected every building project on campus, including Galileo's Pavilion, a **new 3,000-square-foot academic building**. A host of super-efficient practices and products, including Variable Refrigerant Flow (VRF) technology from Mitsubishi Electric, has made Galileo's Pavilion a true showcase of sustainability—with LEED® Platinum certification to boot.

Jay Antle serves as the executive director for the Center for Sustainability, as well as a professor of history. He said, "This is an age where sustainability and green building are going to be increasingly important. We wanted a place for technology to be on display—for

students to learn about renewable energy, energy efficiency and what pioneering, high-performance buildings look like. And the students themselves had expressed interest in having a cutting-edge building on campus to serve as a learning lab for sustainability—so that's where the project began."

The team at JCCC had recently read an article about Studio 804, Inc., a not-for-profit 501(c)(3) in Lawrence, Kansas, comprised of graduate students of the University of Kansas (KU) School of Architecture, Design and Planning. Each year, these students design and construct a technologically sophisticated, green building under the direction of Dan Rockhill, distinguished professor of architecture at KU and the founder and executive director of Studio 804. The organization was a strong match for JCCC's vision, so the school contacted them. Rockhill said, "**We designed Galileo's Pavilion—its two classrooms, lounge and exhibition/display space—using our current knowledge of sustainable design.** We took advantage of the daily and

seasonal cycles of nature to passively cool, heat and daylight the building, as well as supply electricity and utility water. We planned rainwater harvesting, green roof trays, photovoltaics and a wind turbine to further reduce or even eliminate the need to use public utilities."

When it came to selecting an HVAC system, Rockhill said, "We basically had three distinctly separate spaces. Although they're in the same building, the loading on them is different. So that resulted in us needing three separate air-conditioning and heating solutions"—or, zoning. Efficiency was of course paramount, as well: "We pride ourselves on being able to promote sustainable everything, so HVAC is no exception." VRF was the clear choice.

Rockhill had used Mitsubishi Electric VRF on a recent project—KU's Center for Design Research—and had been impressed. "Mitsubishi Electric is, first of all, leader in its field. That's the most important thing. Many of the others follow, but Mitsubishi Electric developed the variable refrigerant concept. They know what they're doing. For Galileo's Pavilion, **we wanted to demonstrate the most technologically advanced equipment in the industry. So VRF and its capacity to simultaneously cool and heat all of the spaces within the building was a fit.**"

He continued, "Mitsubishi Electric was also very generous in working with us on the engineering aspect of the Center for Design Research. I thought that was a real strength. So with Galileo's Pavilion, it was no surprise that Mitsubishi Electric was happy to accept its role and be respectful to the other aspects we were bringing to the project. **Mitsubishi Electric gets passive solar, and gets that it's the sum of the total of all the parts that makes the systems positive.** In other words, it's not just air conditioning and heating, but how that's balanced with many factors. And there was never any pushback from them. It



"Coupling passive design features with VRF—one of the most advanced mechanical system out there—not only provides an extremely efficient means of cooling and heating, but also saves the owner operating costs as well as extends the life of the building."

—Dan Rockhill, distinguished professor of architecture at the University of Kansas and the founder and executive director of Studio 804



was always, "Yeah, that's great."

Since Studio 804 not only designs but constructs each project, once the team finished its plans, construction got underway. "Installation went quite well. The Mitsubishi Electric units are compact and easy enough to install that the whole thing really was pretty simple," said Rockhill.

The team also constructed exterior louvers to block out intense summer sun, a concrete thermal mass floor to absorb and radiate

heat, strategically placed operable windows, skylights for natural lighting, superior insulation, living walls and more.

A solar array of 44 photovoltaic panels and a 2.4-kW wind turbine installed on the site now produce about 70 percent of the building's energy. Loads are reduced through occupancy sensors, LEDs and fiber optics, and a lighting control system. "The school monitors the whole thing," explained Michael Rea, JCCC's sustainability project



manager, “through our building automation system. The Mitsubishi Electric system is integrated into that. So we can see humidity or change set points, for example.”

He continued, “Everything with the Mitsubishi Electric system has been going well. No compressor failures, no leaks, no fan problems, nothing. **Our maintenance is easy, too—just changing the filters and making sure the condensers are clean.**”

Another sign of success: LEED Platinum certification. Rea said, “For us in the Center, we were excited to get something above Silver, our current standard. Galileo’s Pavilion is a showcase about what a sustainable building can be on a campus. We were also honored to receive the 2013 CSI Kansas City Chapter Innovation in Sustainability Award

for the building.”

Rockhill has also been pleased with the project—both for his students and all the JCCC students who have enjoyed the building so far, and who will enjoy it for years to come. “For my students, the experience was very important. The polar ice caps are melting. We can no longer dispute that as hearsay. So educating my students in that area is imperative, because they’ll eventually be seeds that are planted in architectural offices around the country. And then for the Johnson County students, Galileo’s Pavilion makes them more aware of the ways our buildings

impact the environment. It is a living textbook that significantly impacts their education.”

To further that education, detailed informative signs were posted in the building’s lounge, along with an energy management system display that shows the building’s real-time energy usage on a monitor. The whole team says these details, among the building as a whole, have been received positively.

Antle said, “I am fortunate to teach a class in Galileo’s Pavilion and can personally attest to how students have positively responded to this building. The classrooms have a very comforting feel about them. And while the students are here, they are learning both actively and passively about what high-performance buildings can really be. They leave wondering why other buildings don’t have the features this one does. And so in that sense, Galileo’s Pavilion is perhaps the crown jewel of Johnson County Community College’s green portfolio.”

PROJECT TEAM

Architect, Installer:
Studio 804, Lawrence, Kansas

EQUIPMENT

- ▶ (2) PURY R2-Series Outdoor Units
- ▶ (6) PEFY Ceiling-concealed Ducted Indoor Units