



Welcome to the inaugural issue of Mitsubishi Electric's *Facility Management* E-Newsletter – the biannual digital publication that brings you the latest developments and perspectives on using HVAC systems in commercial buildings. Each *Facility Management* issue will have a different focus, and feature interactive content and videos to inspire and provide solutions to facility challenges.

Top Nine Reasons Why Facility Managers Like VRF Zoning Systems

From dormitories to lecture halls, science labs to gymnasiums, most university campuses contain a variety of facilities, each with unique needs and occupant demands. In addition, many universities are demanding that green practices be implemented on campus.



The Mitsubishi Electric system's advanced controls network allows the house director for the University of Southern California's Kappa Kappa Gamma sorority to remotely monitor and control the thermostats in every room of the 20,000-square-foot, four-story facility.

from **Mitsubishi Electric US Cooling & Heating Division** (Mitsubishi Electric) are an ideal HVAC solution for meeting these daunting demands. VRF zoning technology is poised for dramatic growth in all areas of commercial construction because it is a flexible, energy-efficient method of providing comfort control to indoor environments.

The technology works by moving refrigerant through piping from an outdoor unit to the indoor unit (or air handler) in the zone to be cooled or heated, resulting in personalized comfort for each space.

According to **McGraw-Hill Construction**, as of 2012, more than half of educational facilities were green construction projects and this number is on the rise. It can be challenging for facility managers to identify a campuswide HVAC solution that meets the varied demands of campus buildings while also meeting energy goals.

Many facility managers find that **Variable Refrigerant Flow (VRF) zoning systems**

Here are the **top nine reasons** why college and university facility managers like VRF zoning systems:

1. Flexibility. VRF zoning systems provide the flexibility that university installations demand. The systems can be designed using several **indoor unit styles** that meet almost any application. Indoor units can be relocated to meet changing space needs, such as reconfiguring a study room into student dorm rooms. Additional indoor units can be added to a system if needed, as long as it doesn't exceed the peak connected capacity.

2. Complete zone control and monitoring. VRF zoning systems provide personalized comfort control for each individual zone or area. This means that occupants can adjust the temperature of their dorm room, classroom or lounge to their specific preference.



The small footprint and light weight of the Mitsubishi Electric outdoor units enabled installation on the roof of Pacific University's Burlingham Hall, which opened up more valuable living space.

Facility maintenance personnel can control VRF zoning systems through a central control system. The Mitsubishi Electric **central controller** allows facility managers to monitor, schedule and control indoor units from a web browser or central interface.

Donna Lou Guay, house director for the University of Southern California's **Kappa Kappa Gamma sorority house**, Los Angeles, uses the centralized controls. "Because of the system's advanced controls network, I can control the thermostats of every single room in the house from the computer in my office. When I close the house and go on vacation, I can turn the entire system down to 72 degrees and have the peace of

mind knowing that everything is under control."

3. Ease of installation. The systems have a two-pipe design providing faster installations with fewer connections. Many systems can be installed during holiday or summer breaks to minimize student and classroom disruption.

For example, the Kappa Kappa Gamma house needed a complete HVAC retrofit for the 20,000-square-foot, four-story facility that had to be completed over summer break. A VRF zoning system was installed with just 20 days from bid approval to students returning. "The job was 100 percent complete — on time

and on budget,” said Randy Scholnick, director of sales at **Sirius Mechanical**, Corona del Mar, California, who installed the system. “I honestly can say that the Mitsubishi Electric **R2-Series** product literally saved this job! It saved us from many installation, startup and maintenance headaches, and was actually the only solution for this particular application.”

4. Small Footprint. System components are compact and can be installed in tighter indoor and outdoor spaces. The outdoor units are 31 percent lighter than chilled-water systems and are easier to handle and cost less to transport. Pacific University, Forest Grove, Oregon, was able to place Mitsubishi Electric R2-Series outdoor units on the roof of **Burlingham Hall**. This eliminated the need for large mechanical rooms and freed up more space for student living.

Because of the ductless design, they are also ideal for retrofits. Both **Harvey Mudd College**, Claremont, California, and **Miami University**, Oxford, Ohio, used Mitsubishi Electric VRF zoning systems to retrofit dorm rooms on their historic campuses.

5. Maintenance. VRF zoning systems reduce maintenance requirements. No special training is necessary to perform the simple functions of changing and cleaning filters and cleaning outdoor condensing units. One unit can be taken offline and serviced while others continue to operate. **Maintenance Tool** software can help diagnose and guide a system servicing.

6. Energy savings. VRF zoning systems are more than 30 percent more efficient than other types of cooling and heating systems. In 2011, Miami University’s Elliott and Stoddard Halls showed a 61 percent decrease in energy consumption, compared to the previous year, after installing a Mitsubishi Electric VRF zoning system.



The two-pipe, ductless design allowed the project team to retrofit Mitsubishi Electric systems in the 50-year-old dormitories at Harvey Mudd College.

“This new system has already saved us a ton of money and enables me to have many more satisfied customers,” said Doug Hammerle, PE, and Miami University’s director of energy systems. “The Mitsubishi Electric engineering has performed so well that I can say with certainty that VRF is my system of choice for all new outlying buildings on campus.”

VRF zoning systems are designed to meet **LEED®** certification and

help earn LEED points. They can also contribute to other green building

certifications such as **ENERGY STAR®** and can help buildings achieve Net Zero status. For example, at Pacific University, both **Gilbert** and **Burlingham** halls used VRF zoning systems to help attain LEED points.

7. Tax credits and rebates. Many organizations have recognized the efficiency capabilities of VRF zoning systems. Financial incentives in the form of tax credits and rebates on the federal, state and local levels as well as from many utility companies are available to offset the initial cost of the systems. For a comprehensive list of available rebates and incentives, click [here](#).

8. Occupant comfort. VRF zoning systems provide an unparalleled level of occupant comfort. The **INVERTER-driven compressor** makes minute adjustments to help each zone achieve set point, so that the desired temperature is reached quickly and maintained. The indoor units are as quiet as a whisper and the condensing units are much quieter than their boiler/chiller counterparts. This results in less disruption during study time and fewer comfort complaints.

Facility managers also appreciate the simultaneous cooling and heating capabilities of the Mitsubishi Electric R2-Series VRF zoning system. Through heat recovery, rooms facing direct sunlight can be cooled while interior rooms can be heated at the same time.

9. Life cycle costs. Together, the ease of installation, energy efficiency, rebates and reduced maintenance of VRF zoning systems can offset the initial cost and result in significant life cycle cost savings. This frees up resources in the university's budget for additional improvements.



Interview with a Facility Manager – Doug Hammerle, Director of Energy Systems, Miami University, Oxford, Ohio

Mitsubishi Electric US Cooling & Heating Division (Mitsubishi Electric) interviewed Doug Hammerle, PE, director of energy systems, **Miami University**, Oxford, Ohio, for an inside look at using Variable Refrigerant Flow (VRF) zoning systems in school buildings. Hammerle shared his experience with choosing and maintaining **Mitsubishi Electric CITY MULTI® water-source VRF zoning systems** in two of his campus' oldest and most coveted dormitories – Elliott Hall (built in 1825) and Stoddard Hall (built in 1834).



The exterior of the Elliot Hall dormitory at the Miami University of Ohio.

Geothermal is advantageous for our climate here in Ohio, where heating and cooling loads are closely matched over the year. Because temperatures underground are relatively constant (around 55 degrees Fahrenheit), this helps balance the well field temperature and maximize the efficiency of the system.

Brian Isaacs, director of corporate sales for **Habegger Corporation**, Cincinnati, and I did a life cycle cost analysis comparing Mitsubishi Electric's WR2-Series water-source VRF zoning system to more traditional HVAC solutions like variable air volume systems. It was clear that simultaneous cooling and heating water-source systems, coupled with our closed loop geothermal system, would produce energy efficiency aligned with our sustainability goals.

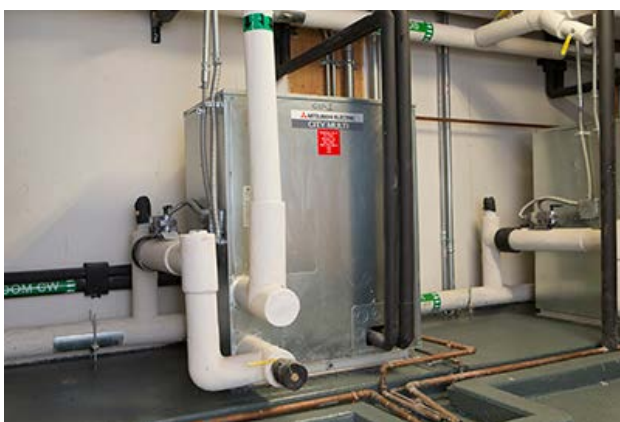
Mitsubishi Electric (ME): What factors went into the decision to use VRF zoning systems for Elliot and Stoddard Halls?

Doug Hammerle (DH): Miami tasked us with developing a utility master plan that would help shrink energy costs. We made geothermal heating and cooling a centerpiece of the sustainability strategies.

ME: Why was the WR2-Series water-source VRF zoning system such a good fit for Elliott and Stoddard?

DH: The potential energy savings from Mitsubishi Electric systems — especially on the heating side — was an ideal fit for our goals. It's impossible for a fossil fuel heating plant to hit a COP [coefficient of performance] of one, whereas with combined geothermal and water-source heat pumps, it's possible to hit a COP of 10.

We did not want our maintenance guys going into the student rooms to install and service individual refrigerant compressors. We instead installed three of the condensing units in the attics of each dormitory, which was made possible by the compact size and weight of the WR2-Series water-source VRF zoning systems.



The mechanical room in the Elliot and Stoddard Halls houses three Mitsubishi Electric water-source heat pumps.

ME: Why was Mitsubishi Electric's VRF zoning the most practical option for these historic buildings?

DH: The VRF zoning, two-pipe option, as opposed to the more traditional four-pipe option, enabled us to maintain the historical and architectural integrity of these structures, which are important to the legacy of campus.

We built wood cabinets with removable panels for periodic cleaning and installed them where the old steam radiators used to be. The reduced size of the indoor units made this possible. There are two small pipes where the steam radiators were formerly located that carry cooling and heating refrigerant quietly to the unit in each bedroom.

ME: Since installation, are you still happy with the systems? What energy savings have been realized?

DH: The system has already saved us money and enables us to have many more satisfied residents. Following the Mitsubishi Electric geothermal installation in 2011, we saw a 61 percent decrease in energy consumption compared to 2010. The oldest buildings on our campus are now the most energy-efficient.



Facilities Save on Energy Costs with New Hyper-Heating HVAC Technology



Mitsubishi Electric's H2i technology offers energy savings, lower life cycle costs and reduced maintenance for schools.

Mitsubishi Electric US Cooling & Heating Division (Mitsubishi Electric) recently unveiled its groundbreaking new line of **Hyper-Heating INVERTER™** (H2i®) ductless and Variable Refrigerant Flow (VRF) zoning systems. This flexible, energy-efficient technology is ideal for various commercial applications, including universities. H2i technology helps schools accommodate various load requirements for separate classrooms and campus buildings, save energy and maintain valuable square footage.

The systems' H2i technology revolutionizes the heat pump by optimizing energy usage and delivering heat at very low outdoor ambient temperatures.

In an environment where high-performance building technology is in constant demand, H2i technology offers immense benefits and helps university building managers overcome issues typically associated with conventional cooling and heating systems.

Below are **five major benefits** of H2i technology:

1. Energy Savings. Because H2i technology recovers heat energy that would otherwise be wasted, energy usage is kept at a minimum. Also, while traditional systems continually turn on and off to meet a desired temperature, the INVERTER-driven compressor quickly adjusts and maintains speed, reducing energy usage and increasing utility bill savings.

2. High-performance. The patent-pending flash process cools the compressor, allowing the zoning system to heat rooms at lower outdoor temperatures without overheating. The process provides optimal heating performance at low temperatures — systems can operate effectively even in outside temperatures at minus 13 degrees Fahrenheit.

3. Lower life cycle costs. Hyper-Heating systems are highly efficient and help decrease the overall equipment tonnage of projects. This means a lower initial cost. The small outdoor system footprint and ability to be installed more quickly contribute to reduced installation costs. The enhanced technology also eliminates the need for supplemental heat sources in many cases, such as fossil fuel burning or inefficient electric systems.

4. Reduced maintenance. Minimal equipment maintenance is necessary from building managers. Hyper-Heating technology offers year-round efficiency for schools and optimal occupant comfort, which translates into fewer complaints and system adjustments.

5. Reliability. Mitsubishi Electric is the pioneer of ductless and VRF zoning technology in the U.S., the first to develop low ambient heating capabilities and has a strong record of product quality and support. Building managers can count on Mitsubishi Electric's H2i technology for reliable, energy-efficient cooling and heating.

Visit www.mitsubishipro.com to learn more about H2i technology.



State-of-the-Art HVAC Controls Showcased at 2014 Greenbuild

GREENBUILD[®]
INTERNATIONAL CONFERENCE AND EXPO
OCTOBER 22-24, 2014 NEW ORLEANS

The popularity of the green movement is undeniable. More than 30,000 building enthusiasts attended the [2014 Greenbuild International Conference and Expo](#) (Greenbuild) in New Orleans from October 22-24. Greenbuild is the premier event for sustainable building. Facility managers had the opportunity to attend LEED® workshops, listen to inspiring speakers and network with professionals. More than 750 suppliers and manufacturers showcased the top green building products and technologies in the industry today. Attendees saw firsthand energy-saving systems and new state-of-the-art controls from [Mitsubishi Electric US Cooling & Heating Division](#) (Mitsubishi Electric).

USGBC President [Roger Platt](#) visited the Mitsubishi Electric booth during the first day of the exhibition to congratulate the division on its recent [USGBC Best of Building Award win](#). The booth featured Mitsubishi Electric's award-winning HVAC systems as well as its recent advancement in intelligent zone control. The [SmartME Zone Controller](#) is an innovative single-source integrated controls solution. The system provides facility managers with easier, more convenient, system-wide HVAC control and monitoring. Booth visitors learned how Mitsubishi Electric's HVAC solutions can help buildings become more sustainable and earn valuable LEED points in the Energy & Atmosphere (EA) and Indoor Environmental Quality (IEQ) categories.

The annual event is sponsored by the [U.S. Green Building Council](#). The 2014

theme, “Leadership Jazz,” not only saluted the spirit of the host city but the hypothetical music of the green movement, which is transforming communities and buildings across the globe.

Watch the [video recap](#) of this year’s event to see why the 2015 Greenbuild is one you won't want to miss.