Bethel, Connecticut

WALNUT HILL COMMUNITY CHURCH

Clay Norman has been a member of Bethel, Connecticut's Walnut Hill Community Church since 1985. Serving as both an Elder and as the Director of Facilities, Norman has seen many church renovations over the years and knew the HVAC system needed to be replaced in 2017. With over 1,000 Sunday service attendees and many church activities throughout the week, energy efficiency for the sake of cost savings was critical. After consulting with an HVAC distributor and contractor, the selection was clear: Mitsubishi Electric's CITY MULTI® Variable Refrigerant Flow (VRF) technology.

CHALLENGE

Selecting an efficient and cost-effective HVAC solution to replace an outdated chiller

SOLUTION

Mitsubishi Electric CITY MULTI® Variable Refrigerant Flow + LEV Kits

RESULT

A quiet and energy-efficient HVAC system that provided significant cost savings and a comfortable atmosphere

THE RIGHT APPLICATION FOR VRF

"We added a sanctuary space in 2002 and that's when we installed the chiller," explained Norman of the original HVAC system. "It started to show its age a few years ago and only worked at about 30 percent efficiency. We started looking at a direct chiller replacement or something with much more modern technology."

Having previously owned a house with a split-ductless system and experienced VRF technology overseas, Norman was curious about what HVAC options could work for the 40,400-square-foot building and invited several HVAC contractors to assess the situation. Upon review, Jim Messenger, service manager, Eastern Mechanical Services, Inc., knew VRF was definitely the right system for the job.

"While the church initially brought me in to replace the chiller, I immediately told them about Mitsubishi Electric's CITY MULTI system," said Messenger. "The church has four, existing 32-ton ducted air handling units. It's a four-pipe system with a boiler, chiller and coils. Taking those out would have been astronomically expensive and difficult. Together, myself, Matt Berry from Mitsubishi Electric and Taylor Cannavaro from Homans Associates sat down and came up with a design-build for the church."

UNIQUE INNOVATION

Faced with large equipment and the need to keep things cost-effective, the three came up with an innovative strategy for the HVAC design: give a unitary system VRF capabilities.

"We decided to utilize Mitsubishi Electric's LEV kits in a unique way. They were retrofitted and sized to fit the current air handlers," noted Messenger. "This allowed us to use the unitary products and existing electrical to get the variable efficiency of VRF. It even allowed all the third-party equipment to communicate with the AE-200 Centralized Controller." Mitsubishi Electric's LEV (linear expansion valve) kits allow

CITY MULTI outdoor units to connect to air handlers produced by other manufacturers. The team also added Variable Frequency Drives (VFDs) to all the air handler motors. "Instead of the motors running constantly like they previously did, we can now soft start them and have the capability to slow down the fan speed to meet the comfort settings of the church," said Messenger. "The motors are now running at two-thirds of their capacity."

Eleven Mitsubishi Electric ceiling cassettes and one wall-mounted unit located in the administrative office also supplement the building for optimal comfort. The result has reduced monthly costs, improved comfort management and showcased the efficiencies of VRF technology.

SIGNIFICANT COST SAVINGS

"Conservatively, the cost savings for this church are projected to be about $50,000 per year," explained Messenger. "When you have a traditional four-pipe system and you're continuously running the chiller or boiler to maintain a certain coil temperature, you're going to lose energy – it's just an inefficient way to condition a building. We sold them on the energy efficiency of VRF. Anytime you talk with a customer about having a five-year return on investment – which is what we got with this project – they're going to listen. Reducing operating costs like that is a huge benefit."

"I do a lot of design-builds with Mitsubishi Electric equipment. I'm in love with the technology. We didn't consider any other brand. This project was going to be Mitsubishi or nothing."

- Jim Messenger, Eastern Mechanical Services

"When we started looking at different brands and systems, I asked questions about energy, longevity and the complexity of maintenance," noted Norman. "There was no comparison between the direct chiller replacement and the CITY MULTI system. CITY MULTI was a hands-down better selection." With installation completed in April 2018, Norman has already begun to see utility bill improvements. "The 2018 cost is already 23 percent lower than 2017," said Norman. "That also represents a 23 percent reduction in usage, with an 8-degree higher temperature for 2018."

SIMPLIFIED MANAGEMENT

Now that the LEV kits have all the air-handling units connected to the system, Norman has one interface to control all conditioning needs and schedule for peak hours. "Previously, the church had an outdated building management system (BMS) that was complicated to navigate," noted Cannavaro, sales applications specialist, Homans – the HVAC distributor for the project. "The AE-200 Centralized Controller gives them full control over their whole network of equipment. They now also have building integrations potential through their BACnet® licensing and they can tie in other systems such as lighting."

The update streamlined Norman's role in comfort management and the congregation has been vocal about the benefits.

COMFORT AND ACOUSTICS

"The level of sound from HVAC noise in our sanctuary has dramatically decreased," said Norman. "The pastor and worship team have even commented on how much more pleasant it is to perform and worship because of the VRF system. We had no idea how much we were putting up with previously."

Worship services were also never compromised – Eastern Mechanical worked with the church to adapt the workflow to the church's schedule and there was never a time the construction disturbed the worship services.

When asked about the whole process, Norman expressed only positivity.

"Updating to VRF was seamless and headache free. I can schedule everything from my computer. Everything has worked so well and we haven't had any issues or maintenance since the install. Most importantly, the system is so efficient and takes a lot of humidity out of the air. It really gives you a better-quality feel of air."

PROJECT TEAM

HVAC Installer:
Eastern Mechanical Services, Inc., Danbury, Connecticut

Distributor:
Homans Associates, Wallingford, Connecticut

EQUIPMENT

- 4 LEV Kits
- 8 PUHY-PTKMU-A, Y-Series Outdoor Units
- 1 MXZ-3C24NAHZ2-U1, Multi Zone Hyper-Heating INVERTER® (H2i) Outdoor Unit
- 1 PKFY-P06NBMU-E2, Wall-mounted Indoor Unit
- 8 PLFY-EPNEMU-E, 4-Way Ceiling Cassettes
- 7 PEFY-PNMHU-E2, Ceiling-concealed Ducted Units
- 2 PVFY-P48NAMU-E, Multi-position Air Handlers
- 2 SLZ-KA12NA, Ceiling Cassettes
- 1 AE-200A Centralized Controller
- 8 PAC-YT53CRAU Simple MA Remote Controllers