The Sacramento Drill Tower, Sacramento, California, is an unusual building. A large water tank takes up two-thirds of the 9,476-square-foot, concrete facility. The other third is occupied by offices for the city's firemen, administrators and IT personnel. For years, these occupants were cooled and heated by a four-pipe chilled-water and boiler system. When that system failed, the city installed a Variable Refrigerant Flow (VRF) zoning system from Mitsubishi Electric US, Inc. Cooling & Heating Division (Mitsubishi Electric). The result: immense energy savings and easy maintenance.

Ngheim Nguyen, mechanical maintenance supervisor, City of Sacramento Facility Maintenance, said, “The old system was really starting to fail on us. There were a lot of service calls to deal with the boiler, then the controls systems. When the compressor for the chiller failed, I told management we should look at investing in new equipment.”

Nguyen was aware of VRF at the time, having attended a presentation hosted by his local Mitsubishi Electric sales representative. “I was fully impressed by VRF and Mitsubishi Electric. They were so far ahead of everybody else when it came to VRF. The engineering aspect and operational maintenance were really in place.”

When the chilled-water compressor failed, Nguyen thought of VRF. “I knew this would be a great application. It wouldn’t be hard to retrofit since we wouldn’t have to open up the walls to pull out old lines. The real selling feature, though, was the energy savings. I knew it was going to be huge for us.”

Nguyen spent several days at a Mitsubishi Electric training center in Southern California. His team hoped to do the entire installation with in-house staff, “so going to classes and looking at equipment in the lab was a big help. The instruction was very useful, and I left feeling confident.”

The team removed all of the old equipment and installed the new system. Nguyen said, “Installing Mitsubishi [Electric] VRF was no different than any other mechanical system, really. The air handlers and coils were pretty easy to work with. We were particularly amazed at the long line sets we were able to do. Typically you get 50 feet; 75 is stretching it. We did ours at over 200 feet.”

“We’re now approaching six years with the VRF system. We’re saving so much money on service calls and maintenance calls. We probably have a tenth of the service calls we had before,” he added.

The city has also seen a dramatic reduction in utility bills due to the new system’s efficiency: a total energy savings (kBtu usage) of 50 percent, and a total cost savings of 19 percent.

Mark C. Brown, senior mechanical engineer, City of Sacramento Facilities and Real Property Management, said, “We are very pleased with the energy cost savings we have seen since the retrofit. In spite of several energy rate increases over the past several years, we are still seeing savings in the range of $5,000 per year.”

He continued, “The 50 percent reduction in energy usage we’ve seen at the drill tower is consistent with two of our other facilities using...”
similar Mitsubishi [Electric] equipment – a senior community center and an administrative building for the convention center. Even though electric systems typically cost more than gas systems, we’re using so little electricity that we’re still saving money.”

The city likes VRF so much that they plan to install it at two more facilities – the marina headquarters and a police station. “We’ve really recognized the value of these systems,” said Nguyen.

To Nguyen, VRF’s value is a combination of three factors: energy savings, satisfied customers and easy maintenance. Regarding satisfied customers, he said, “Previously, air flow was a big problem in the drill tower. There was too much air flow, or too little. Now, the customers can adjust it themselves. And they can barely hear the system operating – no more wind tunnel effect. They really appreciate that.”

Regarding easy maintenance, Nguyen said one of his team’s mechanics “goes there, changes the air filters, checks on the equipment and cleans the condensing units. That’s basically it. And we haven’t had any major failures.”

The project has gone so well that people from all over the area have visited as they plan their own energy-saving projects. Nguyen said, “This has been so rewarding for us. We just set out to do the right thing for the city.”

“With VRF, we don’t see our customers as much. I visit them every so often. They say, ‘We don’t have to call you anymore. Everything is working fine.’”

- Nghiem Nguyen, mechanical maintenance supervisor, City of Sacramento Facility Maintenance

MITSUBISHI ELECTRIC EQUIPMENT INSTALLED:
2 PURY R2-Series Outdoor Units, 2 PDFY Ceiling-concealed Ducted Indoor Units, 5 PDFY Ceiling-concealed Ducted Indoor Units, 1 PEFY Ceiling-concealed HS Ducted Indoor Unit, 2 LGH Lossnay ERVs