One MetroTech

After nineteen years in operation, One MetroTech in Brooklyn New York has taken the path of energy reduction. Through the efforts of its building engineers, this commercial building has taken a step forward in becoming highly energy efficient. Thomas Klein, a building engineer at One MetroTech who earned the Building Operator Certification credential in 2010, took a lead on a building retuning project for improved control of the chilled water pumps. The have been remarkable.

Challenges

A little more than 5 years ago, One MetroTech modernized its original chillers, a process that took approximately 3 years. The chilled water pumps and condenser pumps remained in place because operators quickly realized how problematic the over-sized pumps were for the new system. Valves were throttled to match flows to the new chiller requirements. This reduced water flow by adding pressure drop in the loop, but it left pump power very close to what it had been originally. In the end, the pumps used almost the same amount of energy as they had before the system upgrade.

Project Design

While getting his BOC certification at the International Union of Operating Engineers Local 94 Training Center, Tom Klein realized that the pumps could be run more efficiently by slowing them down with a Variable Frequency Drive (VFD) control instead of throttling valves. He was certain that by making this change he could reduce the system’s energy use; furthermore, he could use a NYSERDA incentives to help finance the project. “It helps when someone else is helping fund your project to help you save energy consumption and costs for the future”

“The squeaky wheel gets the oil,” Klein observed – and these energy-sucking chillers were definitely squeaking. After discussing and analyzing the situation with his BOC instructor, Zach Stern, the One MetroTech team of engineers installed two Variable Frequency Devices (VFD) that slow the flow rate by slowing down the motor. After commissioning and adjusting the new drives, the predicted savings quickly became reality.

“This reduction took place after only a couple of months of installation,” Mr. Klein said.

Quick Stats

Location:
One Metrotech, between Flatbush Ave. & Jay St. Brooklyn, New York 11201

Building Area: 978,544 SF

Building Height: 441 feet

No. of Stories: 23

Date of completion: 1990

Building Classification:
Class “A” commercial office.

Developer:
Forest City Ratner Companies

Tenant:
• JP Morgan Chse
• Goldman Sachs
• Morgan Stanley
• Securities Industry Automation Corporation
• National Grid
• Transcare Corporation
• El Diario La Prensa
• ImpreMedia

THE SAVING STATS

• The original machines dated from 1991. The replacement processes started on 2003 and completed in 2006.

• The original machines’ required flow was 3000 gpm condenser water & 2000 gpm chill water

• The new machines’ required flow is 2250 gpm maximum for condenser water & 1500 gpm maximum for Chill water.
Project Results

- One MetroTech took advantage of NYSEDA’s investment program for buildings that seek to become more energy efficient. ConEd offers a similar incentive.
- The VFDs reduced the rotational speed from 60hertz during the day to 16-35hertz at night, saving approximately 30% of pump energy consumption.
- The initial investment for the purchase of VFDs was $12,500 each.
- In addition to the VFD installation, the parking lot lights were replaced by compact fluorescent lights and switch on from 4pm to 8am.
- The overall building temperature is maintained at 72 degrees Fahrenheit.
- NYSEDA rebate and that also helped in making the decision to install VFD’s. “It helps when someone else if helping fund your project to help you save energy consumption and costs for the future.”
- From electrical readings, about 22-25 amps of savings on one pump that we use pretty much 24 hours /day, 7 days a week.

The Power of BOC Training

Through Tom’s efforts to study, analyze, speak with his fellow building operators and pass on what he had learned, the BOC training helped the engineering team to make this project possible. Tom emphasizes that the BOC courses are voluntarily attended by engineers, but suggests that perhaps they should be made mandatory because of the significant “benefit from the education provided during BOC training.”

Future Plans

- Klein and his team plan to re-lamp the entire garage (3 level/indoor) and stairways with energy efficient lighting systems.
- They are in the process of installing two more VFDs and hope that by next year, a third set of VFDs will be in place on the last set of large pumps.