

Optimization Services

Project: Middle Township Fire Department

An HVAC and lighting efficiency opportunity generating \$11K in savings per year and qualifying for state and national incentives totaling 77% of the implementation costs.

Background

Middle Township, located in Cape May County NJ, has four fire stations, serving a population of 18,000. One of the stations, the Cape May Courthouse Fire Station, which is a 2006-2009 era building, was experiencing HVAC failures, and CM3 was asked to conduct a \$3500 lifecycle assessment for the building's HVAC and automation systems.

Through the retro-commissioning inspection, CM3 determined that the 10-year-old rooftop units did not receive the proper seal coatings from the factory. This meant that equipment that should have lasted 20 years was already failing.

Results

With the cost to correct the problems more than 50% of the equipment replacement cost, CM3 recommended an equipment replacement for the four rooftop units, utilizing incentives from the Atlantic City Electric's Direct Install program. This program included incentives for HVAC equipment replacement, building automation improvements, and lighting improvements totaling nearly 60% of the project cost.

In addition to the ACE incentive, the project was also eligible for financing through the NEIF (National Energy Improvement Fund) at 0% interest for 5 years. Between the two programs, Middle Township Fire Department was able to get more than three-quarters of the cost covered.

Project Scope

- Replace fluorescent lights with LED lights
- Replace four failing rooftop units
- Add Dual Enthalpy Economizers
- Add Demand Control Ventilation for the whole building



Being able to identify and successfully apply for energy incentives is a foundational part of the service we provide. Most customers struggle to implement energy efficiency opportunities without the support of local and national programs. However, the documentation and calculations for these programs is highly detailed, which is why we assist the customer through the entire process. For Middle Township Fire Department, the incentives enabled them to cover 77% of the cost.

Brad Pappal
CM3 Director of Optimization Services



Examples of Findings

Rooftop Units

The rooftop units were found with multiple modes of failure. This was attributed to poor maintenance and improper unit sizing. In addition, the units were not originally equipped with coated evaporator and condenser coils. Without this treatment on the coils, they are unable to be cleaned and maintained, resulting in a required unit or coil replacement. Active mechanical cooling faults were found with RTU 3 and 4.

Makeup Air Unit

The makeup air unit was found in a failed state, not running in either low speed or high-speed mode. Additionally, the controller was in communication loss to the BAS. The unit did not run as expected based on standard criteria.

Variable Air Volume Units

The VAV's were not able to achieve their defined CFM setpoint as prescribed by the air balancer and engineer. In addition, there was no deviation between max and min flow setpoints, preventing the dampers from closing. Multiple heating deficiencies were noted. The rooftop units supplying air to these spaces did not have proper air balancing, and two units were undersized compared to the engineer's design. Due to this issue, the VAV's will never be able to achieve their CFM target setpoints. Upon completion of rooftop unit replacement and balancing, all CFM setpoints should be returned to standard.

Other Equipment Examined

- Industrial air cleaners
- Cabinet and electrical heaters
- Radiant tube heaters
- Exhaust fans

ISSUE 018
PROJECT / EQUIPMENT / VAV10

Occupied min/max and Unoccupied Min/Max flow setpoints are identical, box does not close close off when zone is satisfied or when the unit is unoccupied.

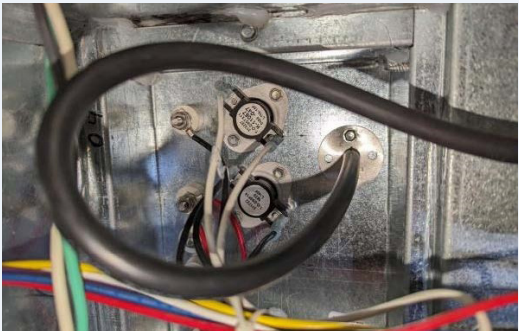
Recommend optimizing flow setpoints to allow for proper control of the space and replacement of heating contactor and verifying unit operation.

CMAXFLO	Cooling Max Flow	200.0 {ok} @ def
OCMNC-SP	Occupied Clg Min	200.0 {ok} @ def
UCMNC-SP	Unoccupied Clg Min	200.0 {ok} @ def
OCCHTGFL	Occupied Htg Flow	200.0 {ok} @ def
UNCHMAX	Unoccupied Htg Flow	200.0 {ok} @ def

ISSUE 010
PROJECT / EQUIPMENT / VAV7

Found VAV set for a common set point of 80° F. The VAV was calling for two stages of heating with no increase in discharge. Further diagnosis shows a high limit switch open and in need of replacement.

Recommend replacement of high limit disc and verification of heat operation.



ISSUE 011
PROJECT / EQUIPMENT / VAV6

Loud humming heard from inside the line voltage cabinet when heating is enabled. No rise in discharge was noted with both stages calling.

Recommend replacement of heating contactor and verifying unit operation.

