# Reducing energy consumption and costs

## Commissioning rooftop units in a community center

### CUSTOMER BENEFITS

- Assurance that system maintenance achieves the desired objectives
- Investment protection to secure and track investments over the long term
- A digital history of building performance
- An information front-end to consolidate building data and make it accessible to all vendors

### PROJECT AT A GLANCE

**Location**
New Jersey

**Facility**
Community center (one story)

**Monitored Systems**
Rooftop units (RTUs)

**Setup Costs**
$1,200

**Maintenance Cost (annual)**
$129

**Projected Annual Savings**
At least $5,200

**Equipment Installed**
The following work was done as a result of the Building Analytics findings:

- The short-cycling compressor was investigated, and a faulty ground wire was fixed.
- A proposal has been issued to solve the scheduling problem by replacing the thermostats that control RTU operation.

### Overview

Building Analytics diagnostics and reporting were deployed to provide ongoing commissioning on newly installed rooftop units at a one-story community center housing offices, a gymnasium, and community rooms. Five RTUs were connected to the cloud-based system for monitoring and diagnostics. Almost immediately, several problems with RTU scheduling, compressor cycling, and simultaneous heating and cooling demands were found leading to controls adjustments to reduce energy consumption and costs.

Only 10 HVAC sensors and settings on each RTU (a total of 50 points) were set up for monitoring: compressor status, cooling demand, gas valve status, heating command, outside air temperature, power status, return air temperature, suction line temperature, supply air temperature, and fan status. Despite the low level of instrumentation, several key issues were diagnosed.

## The Challenges and Solutions

### All RTUs Running Continuously

**Challenge:** The building equipment is supposed to be operational for 12 hours a day, however all five RTU fans were on almost constantly. The calculated cost of the excess operational time was approximately $100 per week. If this trend of excess operational time continued for a full year, the avoidable energy cost would be around $5,200 per year.

**Solution:** A proposal has been issued to remedy this problem by replacing the thermostats that control RTU operation, which were not retrofitted during the original project.

### Simultaneous Call for Cooling and Heating

**Challenge:** The same RTU with the compressor cycling issue has times when it is demanding heating and cooling at the same time. Although the gas valve had not yet turned on, this programmatic issue could cause problems during swing months.

**Solution:** This problem was resolved with repair of a faulty ground wire.

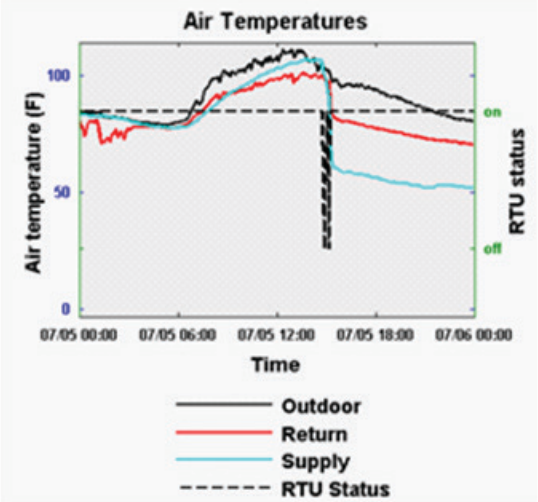
### Short-cycling RTU Compressor

**Challenge:** One of the RTU compressors was found to be constantly short cycling when in operation. Issues with compressor cycling include increased compressor wear and premature equipment replacement, with constant starting and stopping, and comfort issues as cycling issues make it harder to control the supply air temperatures.

**Solution:** The compressor cycling was investigated and resolved when a faulty ground wire was fixed.

## The Bottom Line

This facility earned 23 percent ROI from commissioning its rooftop units. Annual projected savings are more than $5,000.



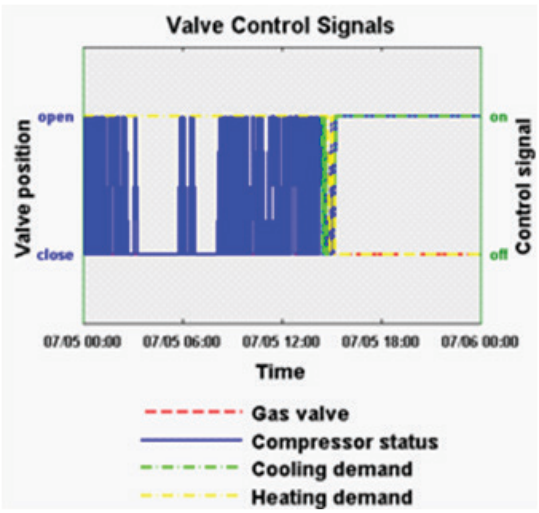




Figure 1: Temperatures and status points from the RTU with the cycling compressor on the day it was fixed. A little after midday, the compressor status stops cycling on and off, and the RTU supply temperature, which had been over 100 degrees, drops.





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