Learning Activity #5
Energy Conservation Opportunities

Instructor Directions:

Explain the exercise to the students and break the class into groups, ideally 4-5 students per group. Ask the students to read the scenario and complete all three steps in their groups. Each group should designate a spokesperson to share out when the class gets back together.

Estimated time for students in group: 25-30 minutes
Overall estimated time for activity: 45 minutes

Participant Directions

Read through the details discovered during an energy audit below. As a group, answer the questions that follow. After 15 minutes of individual group discussion, a representative from each group will be called upon to report the group's findings to the class.

Step 1. Read the scenario.

A 70,000 square foot civic center comprising two buildings (library and city hall) that are served by a common heating and cooling central plant was audited. Conditioned air is supplied in each building by separate VAV air handling units with VAV boxes with HW reheat coils in each zone. The total building EUI is 200 kBtu/sf/yr. Below is a list of observations made about facility operation from a review of the BAS:

BAS Points/Audit Notes

Chiller and boiler annual operation - Both pieces of equipment operate year round.

BAS Chilled Water Supply Temperature - 34 ^{o}F

BAS Pump Operation - BAS review shows that when Pump 1 enabled, both pumps are running

Boiler Outside Air Lockout Temperature - 110 ^{o}F

Occupied Heating Setpoint - 73 ^{o}F

Occupied Cooling Setpoint - 74 ^{o}F

Economizer Damper Position - Economizer 100% open at 90 ^{o}F outside air temperature

CO_2 Sensor reading - CO_2 sensors reading 300 ppm higher than hand-held CO_2 sensor

Stairwell daylighting - Stairwell and corridors are well lit with skylights, yet electric lighting was observed to remain "ON" 24/7.

Step 2. Answer the following questions.

1. What are the operational issues/problems for this facility?

a. The chiller is running at an unusually low supply temperature. Typical design supply is 42-44°F.

b. The heating and cooling setpoints are too close together. With only one degree separating them, the system will constantly toggle between heating and cooling, overshooting both setpoints.

c.

2. How is energy being wasted?

a. With the heating and cooling setpoints too close together, the system never has a deadband to operate within – the time when the temperature is fine and only the fans run. Very inefficient and costly.

b.

c.

3. What are the no-cost/low-cost opportunities for operational improvement for this facility?

a. Adjust the heating and cooling setpoints, e.g. 68°F for heating, 74°F for cooling. That allows the heat to come on when temp drops below 68°F and cooling to come on when space is above 74°F.

b.

c.