BOC 1006 – Common Opportunities for Low-Cost Operational Improvement

Credits:	.7
Lecture:	6 hours
Group Exercises:	1 hour
Total:	7 hours

Prerequisites. None

Course Description. Participants will learn typical areas and problems with different system types and equipment and the relevant diagnostic tools and techniques to identify common opportunities that offer the greatest energy savings potential.

PROJECT: None

Course Objectives and Competencies
At the completion of Common Opportunities for Low-Cost Operational Improvement, a participant will be able to:

1. Develop a building systems operations map.
2. Schedule building systems and equipment, and implement operational strategies to limit equipment on-time.
3. Identify critical control sensors in a building and recognize symptoms of sensor error.
4. Identify control strategies and equipment faults that lead to excessive reheat and recool.
5. Recognize common symptoms of simultaneous heating and cooling.
6. Recognize symptoms of poor outside air control and look for typical problems.
7. Understand concepts of common HVAC systems and how the design makes them prone to certain problems causing excessive energy use.
8. Recall how loggers are used for energy profiling, estimating savings potential, and troubleshooting.
9. Identify applications for loggers and analyze logger data for operating hours, temperatures, loading, and other parameters.
10. Recall how logger data is used to estimate savings potential.

Textbook
BOC 1006 – Common Opportunities for Low-Cost Operational Improvement Handbook, NEEC

Special Equipment

- HOBO U12 Temp & RH data logger @ $115 per logger.
- USB A-to-mini-B cable @ $2-$10 per cable.
- HOBOware Pro software @ $100 per license.
- One computer per student with (optional).

Evaluation

Test 100%

Class Outline

1. **Low Cost Operational Improvements**
   - 1.1. What is a low-cost operational improvement?
   - 1.2. Four Common Opportunities
     - 1.2.1. Equipment Scheduling
     - 1.2.2. Sensor Error
     - 1.2.3. Simultaneous Heating and Cooling
     - 1.2.4. Outside Air Usage
2. **Equipment Scheduling**
   - 2.1. Lighting
   - 2.2. Plug Loads
   - 2.3. Two Case Studies
   - 2.4. HVAC Equipment
3. **Sensor Error**
   - 3.1. Overview
   - 3.2. Case study
4. **Simultaneous Heating and Cooling**
   - 4.1. Causes
   - 4.2. Solutions
   - 4.3. Trend data
   - 4.4. Class Discussion: Two HVAC Systems
     - 4.4.1. VAV with Reheat
     - 4.4.2. Constant Volume with Reheat
   - 4.5. Small Group Activity
5. **Outside Air Usage**
   - 5.1. Quick Review
   - **5.2.** Outside Air Usage: Minimum Requirements
   - **5.3.** Outside Air Percentage
   - **5.4.** Case Study: Outside Air Usage