Recording Light Fixture Operation Schedules

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The most effective way to reduce lighting energy consumption is to turn lights off when they are not needed. This application note outlines the necessary equipment and procedure for conducting a simple lighting study using recorded light levels as a proxy for a fixture's "on" or "off" status. The information from such a study is used to establish a baseline operating pattern. The information will assist you in answering the basic questions:

- ***When are the lights on?***
- ***What is the cost associated with the current operating schedule?***
- ***Does the current operating schedule leave opportunities for saving energy with lighting controls?***

Equipment Needed

- 1 HOBO logger with light intensity feature for each lighting circuit to be monitored
- 1 HOBO software and cable for connection to computer

Procedure

1. **Launch the HOBO dataloggers.** Configure the interval or duration of the logger to log for at least two weeks.

2. **Select one representative fixture in each circuit or lighting zone to monitor.** Place the logger in or near the monitoring fixture, close to and facing the lamp, as in ***Figure 1***. Situate the logger so that light from the lamp will be significantly higher than ambient light. If placed inside the fixture, do not allow the logger to come in direct contact with the lamp or other hot surfaces.

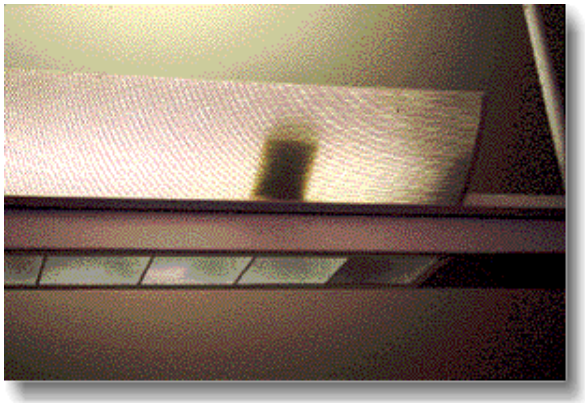

Figure 1: *A HOBO logger placed close to the lamp of an overhead fluorescent lighting fixture*

3. **At the end of the study period, retrieve the loggers, download and analyze the data.** Please refer to the Onset HOBO Software application note for downloading instructions. The

Energy Center has developed an automated Microsoft Excel spreadsheet to assist you in downloading and analyzing lighting data from HOBO dataloggers. We have also written an application note describing its capabilities and use.

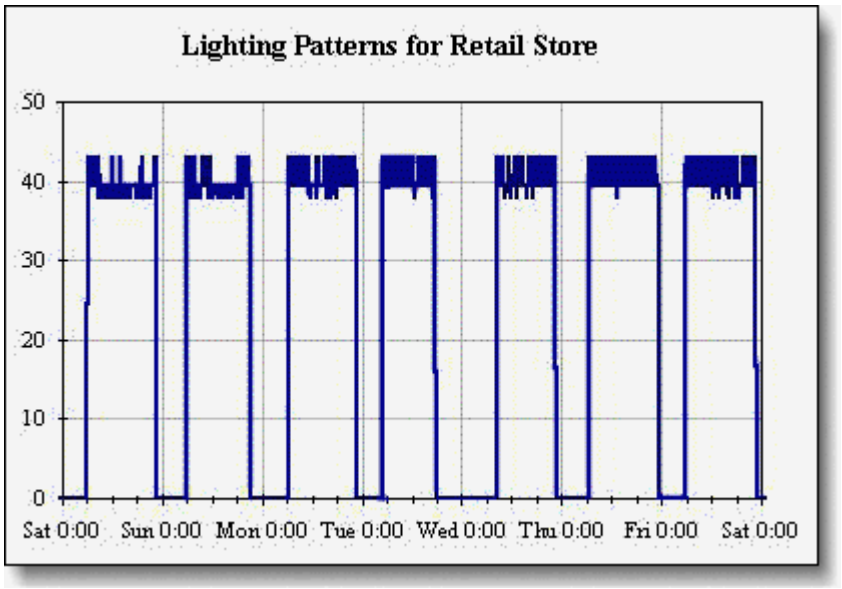

Figure 2: *Graph of lighting patterns for one week*

The loggers have a 10-20% variation in the absolute light level, however, they do reliably indicate whether a light is "on" or "off". In ***Figure 2***, the light use pattern is very clearly shown. Notice in ***Figure 2*** that the light levels vary around 38 to 43. This is a result of the 8-bit resolution of the loggers. Any light readings above 35 mean that the light is on, or that the light threshold is 35.

4. **Total the number of run-hours for each fixture or circuit.** Add the total number of readings that register a "lights on" status and multiply the amount to the time interval specified in the logger. For example, 400 "lights on" readings with a 5 minute interval is equivalent to 2000 minutes or 33 hours and 20 minutes of runtime.

   To calculate energy use, multiply the hours of use by the watts/fixture (dependent on lamp type, ballast type, and number of lamps per fixture) and the number of fixtures.

   Watt hours = hours of use * watts/fixture * # of fixtures

   When evaluating dimming systems, there needs to be a distinction between daylight and electric contributions. Ensure the logger is placed close to the fixture and facing away from any daylighting source.

   For further lighting studies about energy savings potentials, and information on evaluating potential energy savings of occupancy sensors, refer to the Energy Savings Potential of Occupancy Sensors application note.