School Lighting Assessment Exercise

Equipment Needed: Electronic light meter and computer

Lighting energy can be wasted in several ways, by:

- **Inefficient light sources** – when the lamp or fixture is inefficient in converting electricity to light, using more watts (units of electric power) than necessary to produce the lumens (units of light output);
- **Transmission losses** – when dirt or some other obstruction blocks some of the light; or when the light source is too far away from what you want illuminated;
- **Over lighting** – when more light is used than is needed or when a "free" source such as daylight is not used; and
- **Excessive "on" hours** – when lights are on for no reason (e.g., when no one is there).

Getting the most for your lighting dollar often involves:

- **turning lights off when they're not needed;**
- **reducing light levels wherever there is more light than is needed;**
- **installing more efficient lighting or controls;**
- **doing proper maintenance to minimize light losses.**

Perform Audit

Divide class into small groups of 8-10 students, each guided by an instructor or technical adviser familiar with the school lighting system. The guide leads the group to one or more of the school environments listed in the accompanying chart. Letting each group audit a different area of the school accomplishes a more comprehensive exercise. The guide will need to ascertain some detailed information on the types of fixtures, lamps, and ballasts beforehand.

The group will conduct its walk-through audit by inspecting the lighting fixtures in that environment and collecting the following information for each area:
1. Location of lights; 2. Type of fixtures; 3. Number of fixtures; 4. Number of lamps per fixture; 5. Types of lamp (brand, wattage, specific designation or code); 6. Watts per ballast; 7. Watts per fixture; 10. Total watts in area; 11. Present light levels: (too bright__; adequate__; too dim__); 12. Footcandle level:___fc; 13. Lights are on: hours/day__; days/year__; 13. Additional hours lights could be turned off: hrs/day__; days/yr; 14. Is there a switch? 15. Is there an automatic timer__; is it set properly__?

SCHOOL ENVIRONMENT WHERE TASK IS DONE	TASK DONE	FOOT-CANDLES RECOMMENDED
Any space where	Reading printed material	30
	Reading pencil writing	70
	Drafting, benchwork	100
	Lip reading, chalkboards, sewing	150
Classrooms	Art rooms	70
	Drafting rooms	100
	Sewing room	150
	Cooking room	50
	Note-taking	70
Laboratories	Dissection, experiments, etc.	100
Lectures	Audience	70
	Demonstration	150
Music rooms	Simple scores	30
	Advanced scores	70
Shops	Operate machinery	100
Study halls/library	Study/typing	70

In addition to the task-performance areas identified above, recommendations for lighting in hallways, corridors, and stairways are the range of 10-20 fc.

Calculations for determining energy cost-savings estimates

The information collected during the audit can now be entered in the estimator calculation forms published by GE Lighting. (Sheets and website are included.)

These estimation forms allow numerous levels of depth in the lighting energy-savings analysis. The class can begin with a Simple Energy Estimator and then, if desired, continue to estimate the following parameters: Watts Per Square Foot; Lighting Layout Estimator; Fixture Replacement Estimator; Dimming System Watts Estimator; Cost of Waiting Estimator; Simple Life-Cycle Cost Estimator. All of these estimates underscore the value of the exercise.