

# The Value of Maintaining a Lighting System

A Pacific Energy Center Factsheet

## Myth:

Adding more light fixtures is the least expensive way to increase lighting levels.

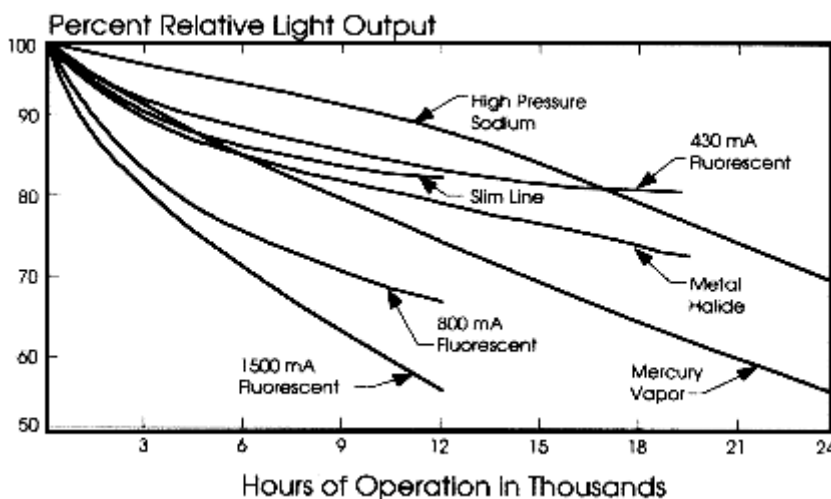
## Reality:

Employing proper maintenance and cleaning programs is the most cost-effective way to increase lighting levels.

In response to employee complaints about poor lighting, facility managers often try to correct the situation by installing lamps of higher wattages, adding new luminaires, or reinstalling lamps or fixtures previously removed to conserve energy. Although this approach may improve the lighting, it does so at a premium cost. A more effective solution is to implement a regular program to clean and maintain the lighting system. Moreover, in buildings with a regular maintenance program, lighting designers can reduce initial illumination requirements, resulting in significant energy savings over the life of a facility.

## The Problem: Lighting System Degradation

Over time, a lighting system produces less light. This degradation can be attributed to two factors -- the accumulation of dust, dirt, and other materials on components of the lighting system and the depreciation of the lamps light output.



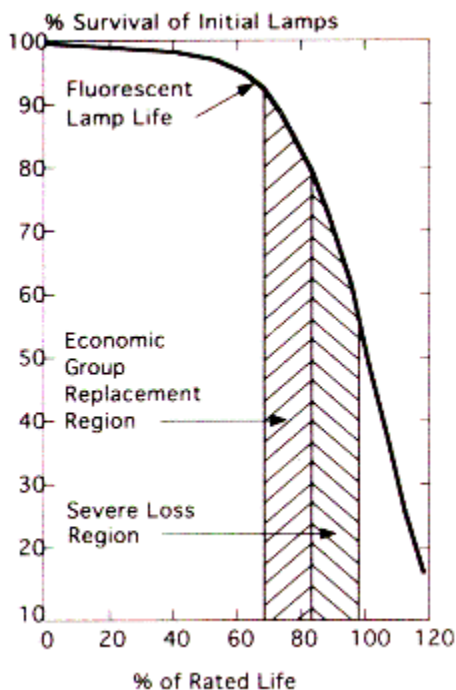
The dust and dirt that accumulates on the lamps, reflectors, and louvers or lenses can reduce the amount of light leaving the luminaire by 30% or more. Discoloration of plastic materials used in some luminaires may cut light even further. In addition, the same dust and dirt accumulates on room

surfaces, reducing the amount of light reflected back into the space by 10% or more, especially in spaces with indirect lighting. The dirt can also trap heat in the luminaire, causing the lamps to operate less efficiently and decreasing the life of lamps and ballasts.

As lamps age, they emit less light. For example, a fluorescent lamp at 80% of its rated life produces 15-35% less light than it does initially. And the light output continues to drop until the lamp burns out.

Taken together, these factors can easily cause a 50% degradation in lighting levels over time. Simply adding more lighting equipment to make up for the degradation does not solve the inherent inefficiency of operating a poorly maintained lighting system. Since even the new equipment would be subject to the same degradation, this solution would be a temporary one at best. Instead, by instituting a regular cleaning and relamping program, building operators can boost lighting levels without increasing energy usage.

### The Solution: Efficient Relamping and Cleaning Schedules



Two strategies exist for relamping: spot and group. Spot relamping entails identifying a burned out lamp, finding a replacement lamp and equipment to change the lamp, and finally, replacing the lamp. This process is time-consuming; the cost of the labor often exceeds the cost of the lamp. In addition, lamp flickering, which can occur near the end of life of certain types of lamps, can damage ballasts and other system components. Group relamping entails replacing all lamps when they have aged beyond their effective illuminating capabilities. Group relamping greatly reduces the labor costs associated with relamping and also provides an opportunity for implementing a cost-effective cleaning program.

Other benefits associated with group relamping and cleaning are:

- Higher illumination levels
- The ability to take advantage of quantity discounts when purchasing lamps and other luminaire components
- Normal operations will not be disrupted because maintenance can be scheduled during non-business hours
- Easier to use proper methods and materials for cleaning Luminaire components can be upgraded during routine maintenance thus sharing the labor costs.

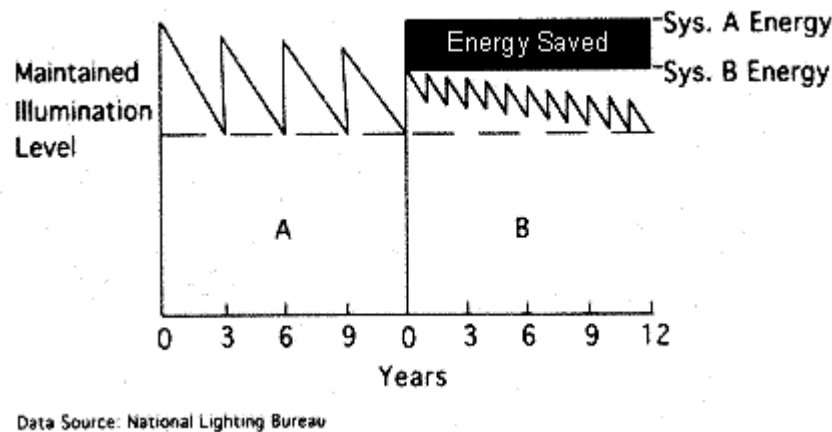
Relamping and cleaning should generally take place when lamps are near the end of their rated life. In dirty environments, cleaning between relampings should also be performed. The optimum schedule can be calculated using factors such as lamp life, lamp lumen depreciation, luminaire dirt depreciation, lamp cost, labor cost, and energy cost.

### Special Opportunities for Existing Facilities

By current IES standards, many existing facilities are overlighted based upon the tasks presently performed in the space, particularly in offices or other areas where computers are used. Based on an evaluation of the illuminance levels, the relamping crew may actually be able to delamp fixtures and remove ballasts, use lamps of lower wattages, or install ballasts that operate the lamps at reduced power. Other opportunities may exist for installing lighting control systems such as occupancy sensors, time switch devices, or dimming equipment. A lighting consultant can analyze the advantages and disadvantages of all the options, making the investment in his or her services worthwhile.

### Opportunities in New Construction

In addition to establishing appropriate target illuminance levels and specifying proper controls, lighting consultants can work with building owners and facility managers to establish a relamping and cleaning schedule. The lighting consultant can then design for lower initial illuminance levels, which will decrease the number of luminaires and the connected load, ultimately reducing both initial costs and energy costs.



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### For More Information

Contact your PG&E representative or call 1-800-468-4743 for more information about PG&E's energy efficiency programs and other services.

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