

Lighting in Industrial Buildings

12.12.13

Exacted from Ernest Orlando Lawrence Berkeley National Laboratory "An Energy Star guide for Identifying Energy Savings in Manufacturing Plants". Written by Ernst Worrell; Tana Angelini; Eric Masanet Summarized by Satya Garg P.E, SM Engineering

Three factors are important for efficiency of lighting:

1. Lumens/watt
2. CRI-color rendering index
3. Life of lamp

HID (High Intensity Discharge) sources:

High pressure sodium and mercury vapor lamps are used for manufacturing and storage areas

Fluorescent - Compact Fluorescent (CFL) and incandescent lights are used for office areas when color rendition is critical.

Metal Halide - can replace mercury or fluorescent lamps with energy savings of 50%.

Replace T-12 with T-8 lamps which last 60 % longer, save 30% in energy

Replace HID lighting with T-5 high intensity fluorescent lighting system. The typical payback is less than 3 years

Use Energy efficient exit signs: Use LED signs which last 10 years compared to 1 year for incandescent lamps. Savings of energy up to 80%.

Replace Magnetic ballasts with electronic ballasts. Electronic ballasts take 30% less power and last 50% longer.

Establish lighting level standards for different areas

Use lighting controls - Manual on/off controls, occupancy sensors, or auto on/off's with manual override

Reduce high intensity discharge voltage: Reducing lighting system voltage can also save energy

Table 1. Typical performance comparison of lighting sources

Lamp	Efficacy (lumens/watt)	Typical Lifetime (hours)	Applications
Incandescent	5-20	1,000	Task
Halogen	<24	1,000	Task
CFL	20-70	8,000-15,000	Task
Fluorescent T-12	60	20,000	Any
Fluorescent T-8	80-100	20,000	Any
Fluorescent T-5	80-105	20,000	Any
Mercury Vapor	30-50	60,000	Hi-Bay
Induction	80	100,000	Exterior, Hi-Bay
High-pressure Sodium	85-150	10,000-50,000	Exterior, Hi-Bay
Metal Halide	70-115	20,000	Hi-Bay
LED	10-120	50,000	Task