

Businesses invest in lighting upgrades for a number of reasons:

- interior design or remodeling work,
- to brighten, soften or improve the lighting quality, and/or
- to save energy.

Whatever your reason for upgrading your lighting system, you will want to take advantage of the energy-saving potential of new lighting technology. This fact sheet provides you with some basic information about lighting options.

## Understanding Your Lighting Options

Before you undertake any lighting upgrade, you may want to request a lighting audit and analysis to make sure your lighting maximizes energy savings and lighting quality. This analysis will compare efficiency, energy savings and cost-effectiveness of various lighting tools and technologies appropriate for your business. Retail businesses like clothing stores, supermarkets and auto dealerships, where colors are important to customer purchases, will want to study the effects of various lighting sources on colors.

When considering lighting upgrades for the purposes of saving energy and related costs, you should consider four different steps:

1. **Turn off lights.** Is it possible to turn lights off earlier or leave them off longer? Are all employees trained to turn off lights when they are not in use? Would your building benefit from a "smart system" in which lights turn off automatically when a room is not in use?
2. **Remove lamps and ballasts.** Are some areas "over lit"? Is it possible to remove some lamps while preserving adequate light in an overlit space?
3. **Replace lamps.** Is it possible to replace existing lamps with more efficient products that will provide adequate lighting?
4. **Replace fixtures.** Is it desirable to replace the fixtures, as well as the bulbs, to overhaul a thoroughly outdated lighting system?

The following charts illustrates the way new bulbs can help you reduce your energy demand.

<u>Replace</u>	<u>With</u>	<u>Est. Energy Savings</u>
Fluorescent	T8s w/electronic ballast	30%+
Incandescent lamps	Compact fluorescent fixtures	65%+
Incandescent exit signs	LED exit signs	89%+
Mercury vapor lamps	High intensity discharge or fluorescent	dependent on application

The following are some sample applications of new technology that can solve specific lighting problems.

### **2 foot x 4 foot Ceiling Lamp Fixtures**

- T8 lamps w/electronic ballast – 30% energy savings at the same light level
- T8 lamps, but with fewer lamps – much greater energy savings, 50%+ in over lit areas, 4 lamps to 3 lamps, 3 to 2, etc.

*Fixtures are typically upgraded with new lamps and ballasts.*

### **Glare Control at Display Terminal Areas**

- Deep-Cell Parabolic – Medium efficiency and good visual comfort
- Indirect Lighting – More expensive retrofit, but provides the highest visual comfort
- Task/Ambient Lighting – Reduce ambient light level to 20-30 fc and add compact fluorescent task lights

### **Exit Sign Retrofit Options for 40 Watt Incandescent Fixtures**

<b>Replacement Lamp</b>	<b>watts/fixture</b>	<b>life (years)</b>
Reduced wattage incandescent	8	10
Compact fluorescent	10	2
Light emitting diode	4	40+
Electroluminescent	1	10

*Fixtures are usually upgraded with new lamps. Beside energy savings, the longer life lamps also reduce maintenance costs.*

### **Incandescent Downlighting**

- Compact Fluorescent Lamps (CFL) – w/reflector to focus light out of fixture
- Halogen PAR Lamps – best used in ceilings <15 feet, dimmable

*Screw-in CFLs with ballast can use existing incandescent fixtures.*

### **Industrial – Low Bay (<=20 feet)**

- T8 (4' or 8') – w/electronic ballast and reflector
- Wide-Distribution/Low Glare HID – metal halide or high-pressure sodium with glare shielding
- Task Lighting – at work areas and loading areas

*Low ceiling installations require careful consideration to minimize glare from the lamp. Fluorescent lamps should be considered in these situations because they distribute lighting more evenly, usually with less glare than the point source HID lamps.*

### **Industrial – High Bay (>20 feet)**

- HID Luminaries – w/reflectors in clean environment, up to 40'
- High Pressure Sodium – for maximum efficiency and fair color rendering
- Metal Halide – for good efficiency and good/excellent color rendering

### **Other Information**

In considering lighting upgrades, you will want information about a number of variables that can affect the efficiency and usefulness of your system. These include:

- recommended lighting levels for various activities (measured in foot-candles),
- lumens/watt, a measure of lighting efficiency,
- lamp hours, the estimated life of a bulb, and
- CRI, a measurement of an object's color as it appears under a lamp in comparison to its color in daylight.

### **For More Information**

Contact your account manager, or call 1-800-303-7479.