

Clean Air Counts

Strategy Fact Sheets

Energy Efficient Lighting



CLEAN AIR COUNTS *Make A Visible Difference*



What is Energy Efficiency?

Energy efficiency refers to a ratio of the energy output of a machine or system to its energy input. In other words, the more efficient a machine or system is, the more the energy put into it is converted into energy used for its purpose and not wasted. Energy efficiency is not the same as energy conservation, which involves forgoing an activity in order to conserve energy. The two strategies have similar goals, lower energy use, but energy efficiency does not sacrifice quality for the sake of energy savings. Energy efficiency is often the first goal of an overall strategy of conservation.

Energy efficient lighting is a low-cost strategy that reduces energy use leading to reduced air pollution from coal fired power plants. Even though lighting technology has vastly improved over the last quarter century, outmoded lighting technologies have continued to be used in many applications. Using older technology not only has a negative effect on the environment, as energy is wasted and pollution increases, but it costs more money to operate than newer technology. For a business, practicing energy efficiency can improve the bottom line.

What is Energy Star?

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

Energy Star works with product manufacturers to design products that are more energy efficient than the industry standard, and educates contractors and building architects on energy efficient design. These products feature the Energy Star logo and typically have a 10-50% greater efficiency than non-energy star appliances.

The Benefits of Using Energy Efficient

How to Implement an Energy Efficient Lighting and Energy Star Product Program At Your Facility.

Depending on whether you are doing a new construction project, major rehab or simple interior re-design, there are energy efficient lighting scenarios to consider.

Step 1. REVIEW YOUR CURRENT USAGE.

Conduct an energy audit of your building, using a certified contractor or a qualified technician within your facility. An audit should include the following:

- A comprehensive analysis of energy costs.
- Specific recommendations on energy- and cost-saving renovations.
- Recommendations to reduce electrical (or other fuel) demand costs.
- Estimated costs of energy efficiency measures.
- Projected annual energy and cost savings.
- Available financial or other support from the utility (or others) for specific measures.
- Recommendations on further analysis needed.

Step 2. REWRITE SPECIFICATIONS.

Specifications or operations policies for lighting and energy systems should be modified to include new materials and inserted into project specifications, and facilities employees should be trained on their use. Information technology products such as printers, copiers, and computers, many of which have Energy Star settings, should be given preference in purchasing specifications.

Step 3. COMMUNICATE ENERGY EFFICIENCY INITIATIVE TO ALL TENANTS AND VISITORS.

Let your building tenants and visitors know about your initiative to promote energy efficiency, with educational signage and programming. The more support you have from building occupants, the more success the program will ultimately have.

Products includes:

- Reduced smog-forming pollutant emissions from power plants.
- Improved electrical system reliability.
- Reduced electrical and cooling loads in buildings.
- Reduced energy costs.
- Reduced maintenance costs.
- More appropriate lighting levels.
- More comfortable workplace.

How to Use This Fact Sheet.

This brochure provides the assistance you will need to implement a successful energy efficient lighting and Energy-Star products program. The following steps address ways in which you can identify features of building lighting as well as examples of lighting retrofit scenarios. Please refer to the product specifications included in this brochure which will assist you in identifying energy efficient lighting.

Clean Air Counts is a voluntary, public-private initiative to reduce smog-forming pollutants and energy consumption in the greater Chicago, six-county region. It is a collaborative effort between the Metropolitan Mayors Caucus, the Illinois Environmental Agency, and US Environmental Protection Agency – Region 5.

Clean Air Counts is made possible through the support of The Chicago Community Trust, Gaylord and Dorothy Donnelley Foundation, Grand Victoria Foundation, John D. and Catherine T. MacArthur Foundation, and the U.S. Environmental Protection Agency.



Step 4. REPORT ON YOUR ACHIEVEMENT.

Reporting on your energy efficiency initiatives shows our regulatory agencies that air quality is improving through market forces, reducing the need for tough regulatory measures. Report online at www.cleanaircounts.org. Need help? Email info@cleanaircounts.org.



Product Spotlight: Energy Efficient Lighting



Energy Efficient Lighting involves a combination of strategies such as relying on more natural daylight, using energy efficient light bulbs and ballasts, improving lighting controls, adjusting light to appropriate task levels, and performing regular maintenance on light fixtures to increase performance and longevity.

An audit by professionals is highly recommended, as the energy savings of an additional efficiency measure unknown to facilities staff may eventually offset the cost.

Energy Efficient Ballasts and Lightbulbs

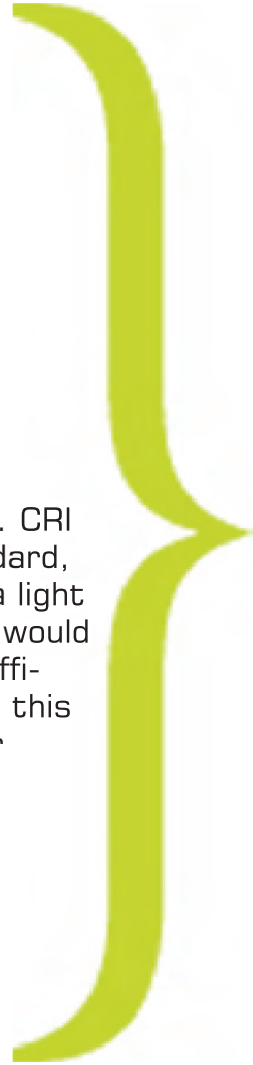
When using artificial lighting, the application of the lighting will dictate what lighting technology is best. For instance, in office settings, fluorescent tube lighting and/or recessed canned lighting is often appropriate, where high pressure sodium lighting might be appropriate for manufacturing areas. In all cases, the lighting used should meet the needs of the tasks to be performed.

The efficiency of lighting varies based on the type of bulb used. Figure 1 shows a comparison of efficiencies for various lighting applications.

Color Rendering Index and Correlated Color Temperature

Color Rendering Index (CRI) is an important consideration for task lighting. CRI refers to the ability of a light source to render colors reflected to a standard, such as daylight. Daylight is given a CRI of 100. Lower numbers indicate a light source that will not reflect all the colors of an object compared to how it would be reflected in daylight. For instance, low-pressure sodium, though very efficient, gives off an amber hue and has a CRI of 0-18, and colors not within this hue will not be reflected. It is often used in security settings, where color rendering is less important than long lasting, efficient lighting.

Correlated Color Temperature (CCT) is also important in choosing lighting for the correct task. CCT is measured in Kelvin (K). Lower color temperatures (below 3200K) are usually considered warm, while those above 4,000K are considered cool. 5100K is a popular fluorescent CCT for a cool light. Daylight is 6500K. Some tasks, such as reading and graphic design, are better done in higher CCT lighting. Usually, especially with fluorescent lighting, all that is needed is a new bulb that has a higher CCT. Employees should be considered when choosing to switch, and it is often a good idea to have a test area before switching to a different CCT.



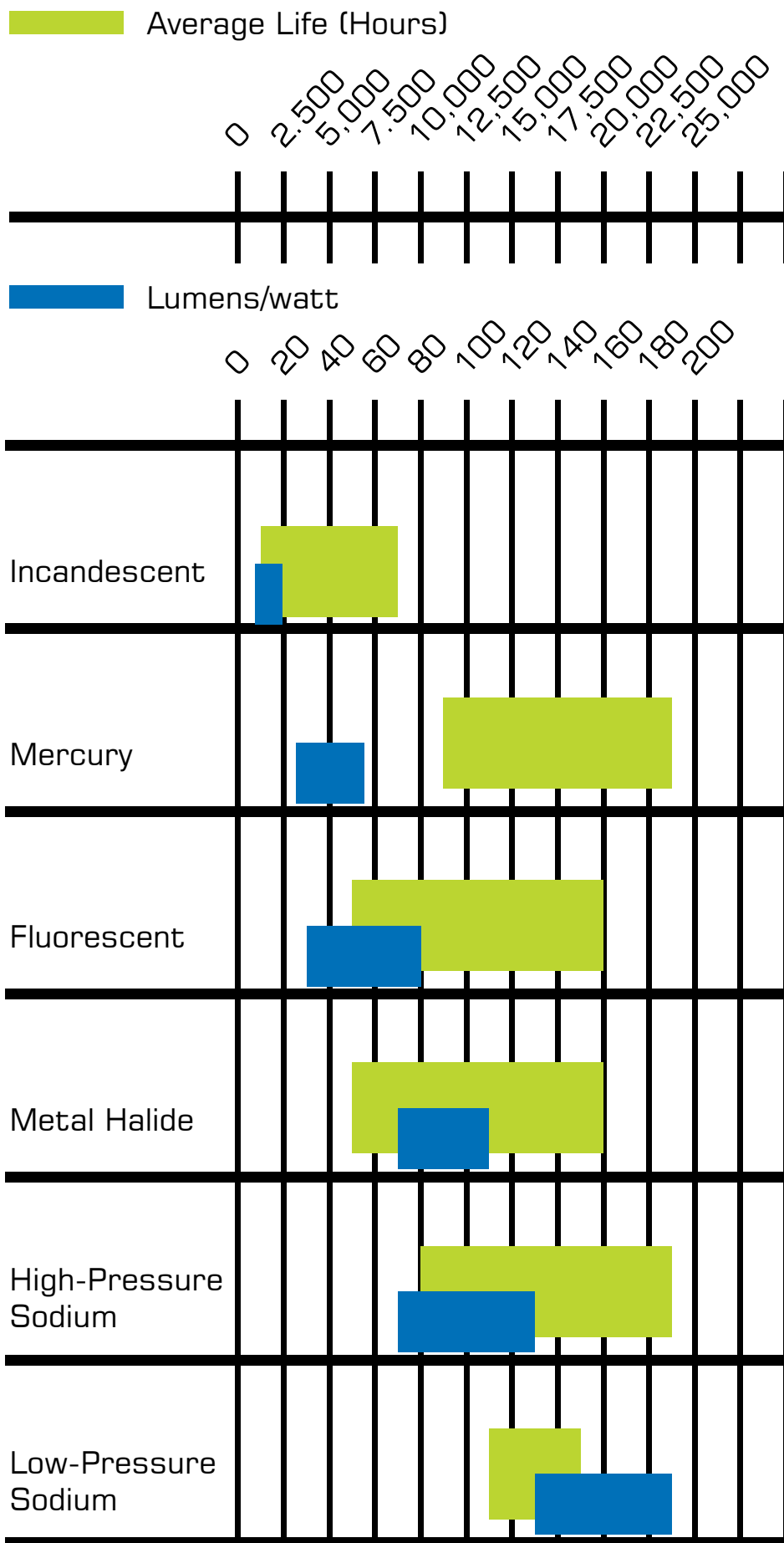
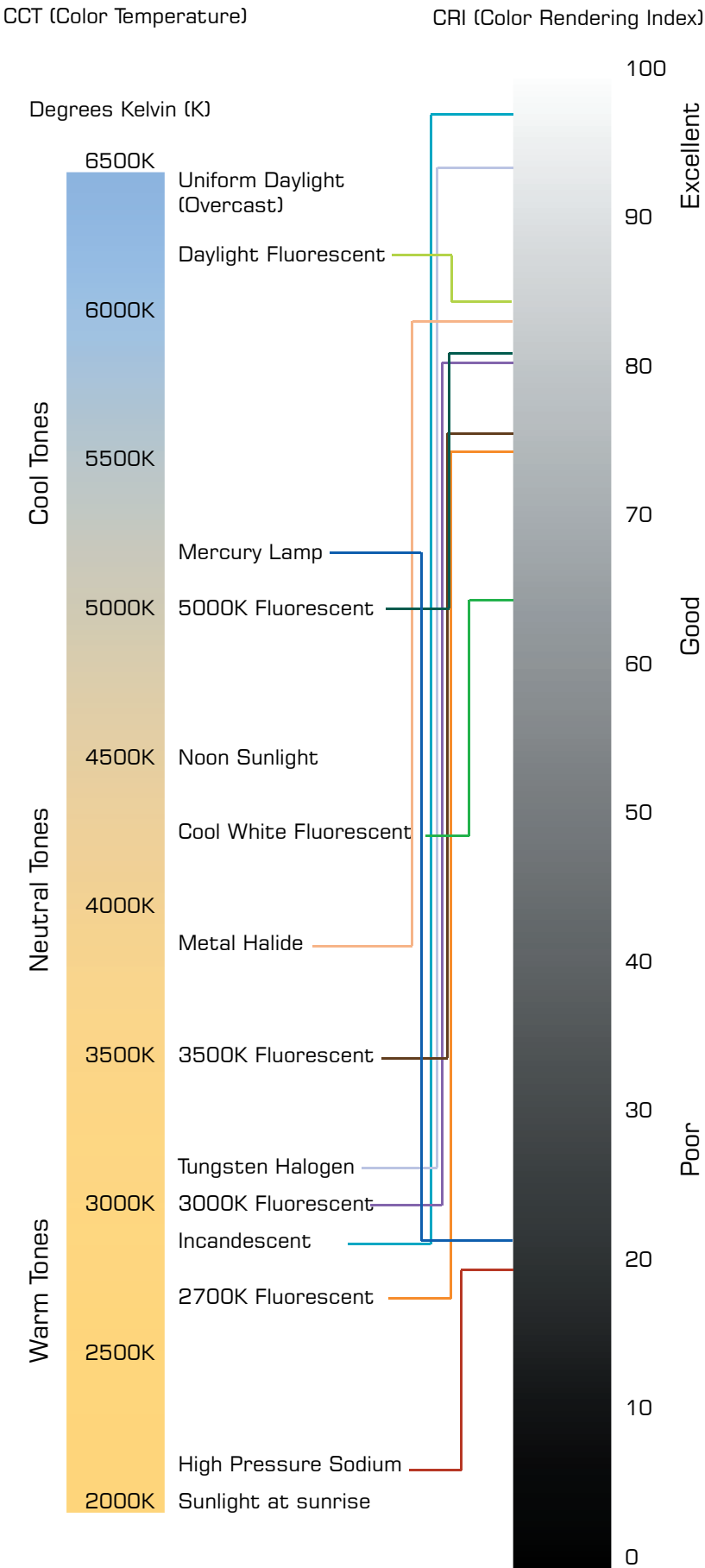


Figure 1. Luminous Efficiency of Lighting Applications. Use the chart to compare different lighting applications based on longevity and efficiency.

Figure 2 illustrates the CRI and CCT differences in lighting applications. Use this figure to compare color temperature and color efficacy of different lighting applications.



are interested in occupancy sensors should keep the following in mind:

- 1) Lighting usage patterns.
- 2) Sensor calibration and type. Infrared sensors do not have the range of ultrasonic sensors.
- 3) Line of sight. This depends on the sensor type. If occupants will be obscured from the sensor, such as in a bathroom stall, then this must be taken into account.
- 4) Direction of motion. Ultrasonic sensors typically work best when occupants are moving away or toward the sensor. Infrared sensors work best with lateral motion.
- 5) Switching on and off constantly may shorten some lighting appliances. Follow manufacturers recommendations.
- 6) Finally, monitor the occupancy sensors after installation and adjust based on occupant feedback.

