LET'S SAVE ENERGY

School Energy Efficiency News

KSBA-SEMP ... Cultivating energy efficiency, best practices in Kentucky school districts

November 2016

History of Electric Lamps and Lighting

and Opportunities to Consider

Lighting long has been a key component of schools. From classrooms making the best use of oil or gas lamps to classrooms designed to use natural light "over the pupil's left shoulder," the evolution of lighting in the classroom has a long, rich history.

During those early days, windows were key to the classroom. Daylighting standards called for specific window area and window-to-floor area ratios, stating that 40 to 50 percent of the total wall area should be windows.

Thomas Edison's first commercial incandescent bulb in the 1870s indicated a potential for electric lighting for schools. However at that point, electric lighting levels were limited, as was the length of illuminating time.

In the late 1800s, a different technology called arc lamps provided improvements in lighting levels and "burn time." As developments came in power generation, so did the types of arc lamps. The early carbon arc lamps were replaced with other types of discharge lamps like the mercury vapor, sodium and then fluorescent lamps.

Early standards for electrical classroom lighting were published in the early 1900s. Initially, with only expensive incandescent lighting being available, the minimum requirements were "3 foot-candles of artificial light." In the late 1930s, fluorescent lighting was three times more efficient than incandescent and quickly became the choice for schools. The minimum requirements for artificial lighting were raised to 30 foot-candles and then later to 50–70 foot-candles, depending on the classroom subject.

Over the past 50 years, the impact of several energy crises led to further advancements in lighting technology. Light Emitting Diodes (LEDs) technology was introduced and had been costly until the past few years. As the technology has advanced, LEDs' energy efficiency has increased and cost has been drastically reduced. Given the light quality and long life, coupled with the efficiency, LEDs are here to stay.

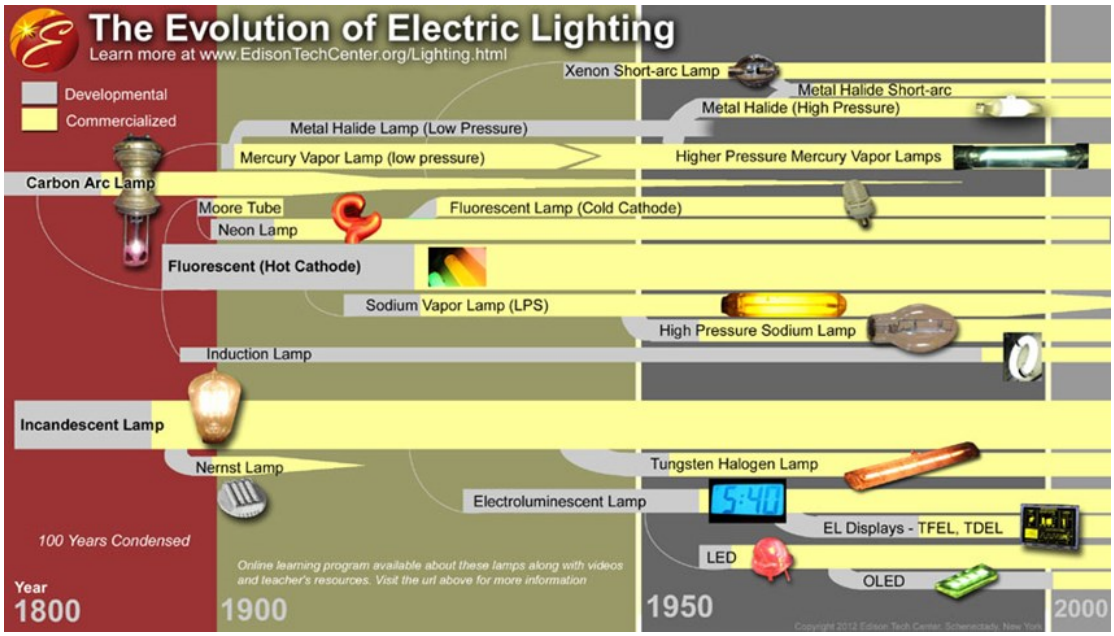


Illustration from: www.edisontc.org/lighting/

Choosing the Best LED Project

There are a number of factors that should be considered before choosing LED lights. Choosing the best option for a specific application will likely include evaluating the following:

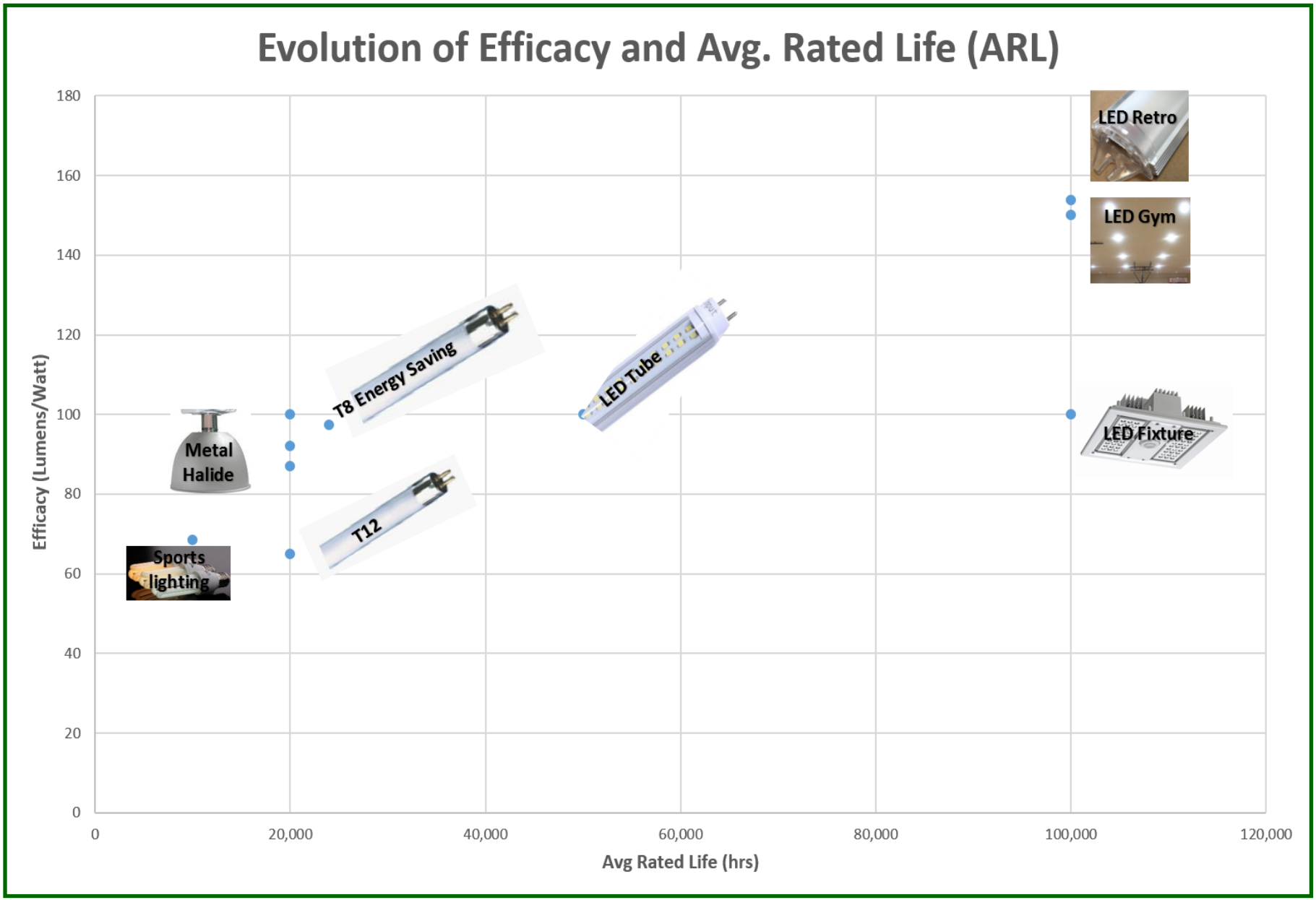
- *Lumen output* (compare apples to apples).
- *Color Rendering Index* (CRI) Color quality and appearance. ENERGY STAR requires qualifying fixtures have lamps with a CRI rating above 80.
- *Compatibility* with existing fixtures (warm white, cool white or daylight?).
- *Energy use* (wattage of the light fixture).
- *Luminous efficacy* (lumens per watt). Luminous efficacy is a measure of how efficiently a light source produces visible light. Lamps with higher lumens per watt have higher efficiency.
- *Light distribution and angle of view* (Lighting representative should provide you with a layout showing the foot-candle levels and what is recommended for the application).
- *Rated life* (L70) versus operational time
- *Life cycle cost*. Payback period based on hours of operation and cost of material and maintenance.
- *Warranty* (How long is the warranty and what does it cover?).
- *Dimming characteristics*
- *Are the fixtures rated for damp locations* (bus garages, warehouses, etc.).
- *Can occupancy sensors be installed in the fixture?*
- *Has the fixture been tested and approved by the Design Lights Consortium (DLC). (PLEASE NOTE: some utility rebate guidelines require the DLC certification to be eligible for a rebate.)*

Information provided by Energy Manager Terry Anderson, Fleming County Partnership. Contributing info from Greg Saylor, Arrow Electric

CONSIDER THIS . . .
From incandescent to CFL to LED, lighting technology has advanced with "warp speed!" Before making major lighting decisions, ensure you know the questions to ask and the terms to understand.

Enlightening Terms

Ballast	A collection of electronic parts that regulates the electric current through a fluorescent lamp.
Diffuser	A covering or shade over a light or lamp that generally softens or scatters the light and is usually used to eliminate spots and glare. May be made from glass or plastic.
Efficacy	A description of the efficiency of a light source, as measured in light produced (lumens) per unit of power consumed (watts).
Fixture	A complete lighting unit consisting of a lamp or lamps and the parts designed to distribute the light, position and protect the lamp(s), and connect the lamp(s) to the power supply.
Foot-Candle	A measurement of the intensity of light reaching a surface.
Lamp	In the lighting industry, "lamp" is the term for a light source. Technically, incandescent light bulbs, fluorescent tubes, CFLs, and LEDs are all considered "lamps," and table and desk lamps are referred to as fixtures.
Lumen	Measure of light.
Rated life	A lamp or light bulb's estimated lifetime measured in hours.
Watts	Measure of power, or energy consumed per unit of time.



You can see why we like LED Lighting: You get a lot of light for a low amount of energy (efficacy) and it lasts for a long time

Woodford County Schools Celebrates 100% ENERGY STAR Schools and Buildings

Five Woodford County schools, as well as the central office were recognized in October for their energy reduction and becoming an ENERGY STAR School OR ENERGY STAR Office Building. From left are: From left to right Southside Elementary – Stacy Rutledge and Pam Shouse; Safe Harbor – Garrett Wells; Northside Elementary – Emma Mulvihill; Woodford High School – Rob Akers; Central Office – Amy Smith; Middle School – Tracy Bruno and Jeff Rhode. Please note that Huntertown Elementary and Simmons Elementary schools are also ENERGY STAR certified, but were presented certificates of recognition at an earlier date.

A band, chorus, and even a quintet, were part of the district-wide celebration for Woodford County Schools 100% ENERGY STAR recognition. Annual savings achieved are over $80,000.