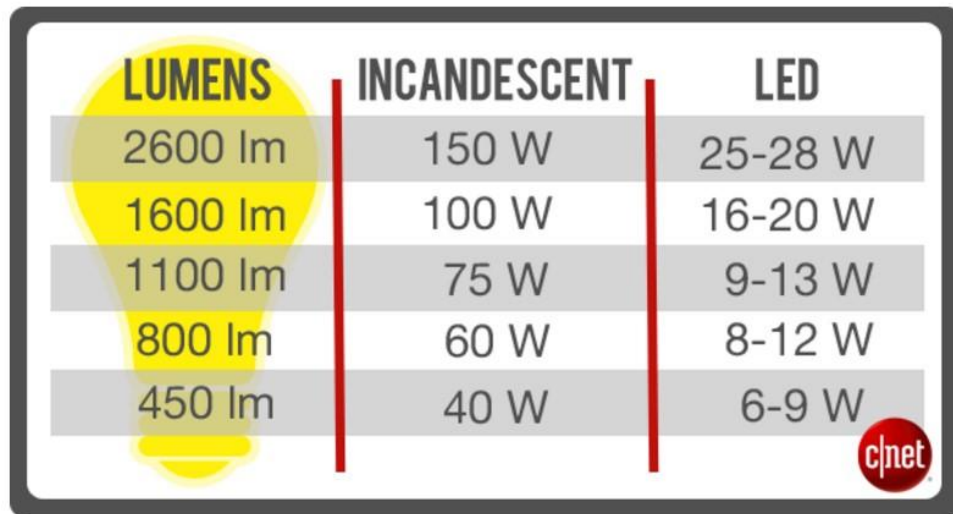# Light and Sustainability

Light and Sustainability

Since Homo erectus began using fire for lighting, humans one way or another have kept nights lit. Gone are the days that the first street lights came about. Public gas street lights were quite common in early 1800s. London, Baltimore, and Paris were among the first cities that were lit up at night. Late 1800s brought us the first electrical lamps and things changed ever since. Maybe the population has grown, but we are ever making things more efficient since then. It's more efficient than the old days when oil or gas was burnt locally to produce light. However, it is still in our best interest to consider sustainable lighting as we move forward.

The first and most important step in selecting the fixtures for a project is considering lumens instead of watts, which can reduce carbon footprint drastically. A 20 watt LED lamp could produce 1600 lumens just as a 100 watt incandescent lamp does. Although CFL lights also have lower carbon footprint, as a 23 watt lamp can substitute a 100 watt incandescent lamp, but their light spectrum cannot compete with that of LEDs that have closer light spectrum to natural light.
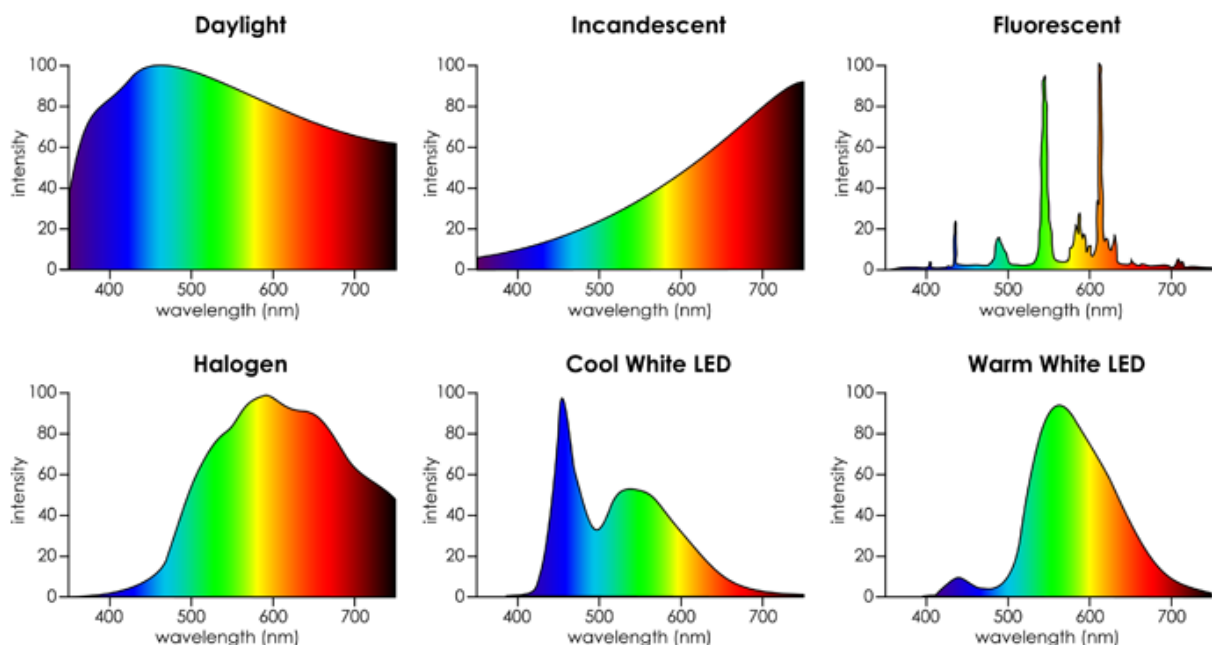
Sharon Vaknin/CNET

Another issue that designers and architects must keep in mind is choosing products that have longer life spans, thus reducing the future maintenance costs and putting burden on the environment. Although most parts can be recycled, one should consider the toll it takes on the environment. LEDs do beat other lamps in life span. Yet there are other issues to consider. It's worth noting that that some LED lights still have high levels of heavy metals and lead. CFLs have mercury which is poisonous in case it breaks. So in terms of dangerous materials for environment, there is a draw there. Both CFL and LED produce harmonics which can take its toll on the grid if it's not checked and remedied. Harmonic filters could be costly. Harmonic disturbances could reduce the capacity of transformers and cables. Also both these lamps influence power factor and might have rush currents that affect sensitive devices. Dimming requirements and costs also have to be considered when selecting a product. These might not be big issues to be concerned about in a residential building, but industrial projects could become very costly.

LED blue light was introduced in 2014, while green and red LED lights were available before. With availability of blue light LED, LED light bulb was finally produced. Although LED has a closer spectrum to daylight, shortwave blue light is suspected to have a role in inducing retinal damage. Blue light also affects animals and plants. It could also cause sleeplessness. Here Eric Bretschneider argues that the intensity of LED light is very low compared to daylight, or other light sources that we are exposed to on a daily basis. Although these findings are not definitive, one should consider all these information while choosing lighting option for different projects.

Mausoleums, palaces, mosques and even regular homes in old Persia have benefitted from mirrors and windows to make the most of daylight or the faintest light source inside at night. Perhaps, when all is said and done, incorporating some old ideas into new designs save energy and make designs more efficient and eco-friendly. After all, the most sustainable design is the one consuming less energy.

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Mirrors used in ceiling to reflect light
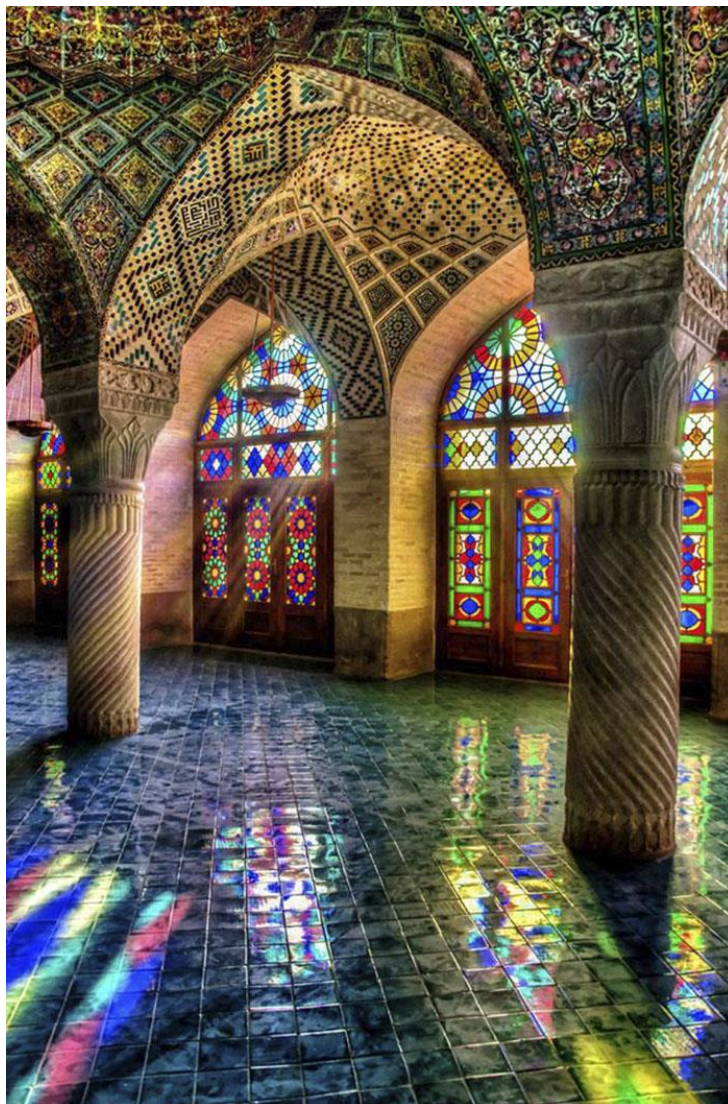
Nasirolmolk mosque in Shiraz utilizing daylight with stain glass

References

Light-emitting-diode induced retinal damage and its wavelength dependency in vivo

A Reality Check on Blue Light Exposure

LED Lighting and the Pitfalls of Power Quality Issues

Think Beyond White LED Grow Lights [Kelvin and Color Temperature]

How to choose the right LED light bulb

Light and Sustainability