

SAVING ENERGY BY LIGHTING

In Italy many cities and RCHEP plan to use LED solutions for internal and public lighting to reduce a good slice of energy consumption.

We're attending a real revolution in the market with the introduction of lighting devices for civil and industrial applications based on LED technology.

LED is based on electroluminescence with an efficiency of 80%. Compared with 4% of a traditional bulb lamp of perceivable light radiations, 15% of halogen lamp and 40% of a low power lamp, this data is very important.

LEDs lighting devices are strongly used in electronics and signaling application with low power and lightness since the eighties. Today the main companies in this field, HP and Philips, are developing new high power devices that give us great possibilities to dramatically decrease the consumption in our RCHEP. But why are LEDs so attractive?

CURIOSITY : Even if it's not well known, LED are "reversible machines" : in fact their junction is exposed directly to a strong light source or solar ray, LED technology is able to produce a potential correlated to the intensity of the incident light.

This feature is usually used in specific sensors and solar chasing in small photovoltaic panels or concentrators.

Maybe in the future LED devices are able to produce energy through sunlight and use that energy to produce light during the night for virtually zero consumption?

The Italian RCHEP which are participating in the SAVE AGE project mostly reduced their energy consumption by changing traditional lamps to LED technology.

Italian RCHEP are often very old buildings which formerly were convents built between 1400 and 1600. Only in some cases we found new buildings, built up in the last 20 years.

We are in front of structures with very thick walls with no possibilities to make some renovation due to legal constrains for historical buildings.

In Italy all districts have their landscape territorial plan and it's not allowed to make any changes in the structure without having a special permission of the provincial board that we call "belle arti".

Many RCHEP are in this situation, so it's impossible to obtain the permission to change the look of the building. This is obviously necessary to plan an installation of any type of photovoltaic or solar thermal panel.

In this very common situation, public or private administrations don't take the risk of an illegal installation to reduce the energy cost of their RCHEP.

In Italy we've noticed that this is a primary problem of saving energy

for a large number of RCHEP. We need a different strategy and action plan.

In RCHEP more than 30% of energy is consumed by lighting, because the lights in RCHEP are always switched on in many areas and especially in common areas.

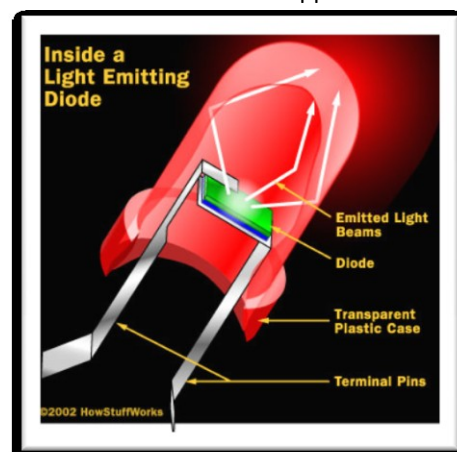


Figura 1 Internal LED structure

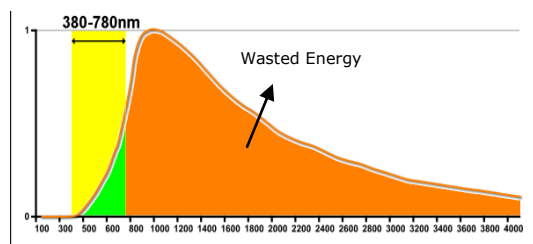


Figura 2 Bulb lamps emit radiation out of visible field length wave.

Corridor lights and headboard lights are usually switched on around the clock. Self sufficient inhabitants often want a guiding light during the night to permit them to reach the bathroom without problems. In other cases visual impairment could be a great risk for elderly people in poorly lit rooms.

For example a medium RCHEP has 50 tubular fluorescent or CFL (one of the most efficient types today) night lights and 100 headboard lights (usually incandescent lamp type).

We estimate a consumption of about 2kW for a 10 hour night. So we need 20kW/night.

Using LED lamps, we can replace tubular fluorescent lamp in corridors and headboards with a total power consumption of 0.5kW. A great save can be obtained only by replacing headboard lamps with 1W LED solution.

RCHEP can save much energy by planning a progressive substitution of traditional and fluorescent lamps, starting with the lamps that are always switched on.

Now we understand the great potential of LED and we need to consider also the lower cost of the management for LED devices. The lifetime of LED lamps is longer than 50000h, with negligible loss of efficiency.

Further RCHEP power consumption reduction is realized with integration of motion detectors and dimmers in consideration of sunlight.

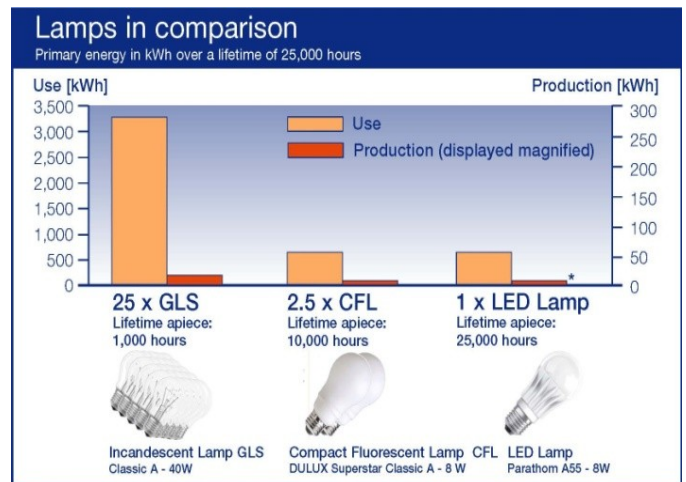


Figura 3 Comparison between some types of light solution lamps.