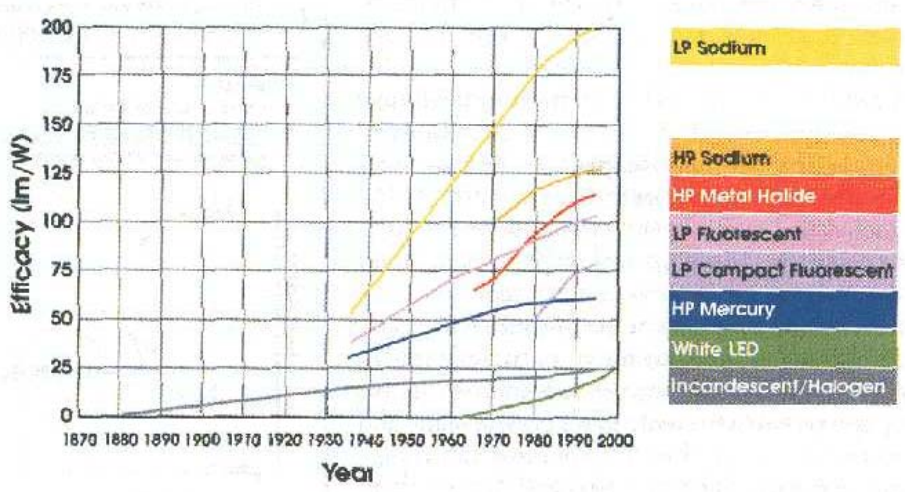
Applications of electrical discharges in lighting : *newer pespectives*

It is interesting to consider the efficiency of a light sources. This may be defined as *the light output in lumen per electrical input in watts.* A graph of the evolution of the efficiency in several types of light sources is seen in Figure 1.



(source of graph: Europhotonics, December/January 2004)
Figure 1. *Evolution of efficiency of various light sources.*

It is seen that the so called low pressure sodium electrical discharge lamp has increased its efficiency in 50 years by about a factor of 4 !! This may indicate the importance of understanding of the mechanisms of electrical discharges and interaction with the glass envelop; it may give as rewarding result an improvement in the efficiency and stability of the performance of the lamp over the years.

The principle of electrical gas discharge is the generation of phottons by excitation os such species as metal vapours and rare gases. It looks like inverse photoelectric effect! In other words, the electrical voltage eventually leads to emission of photons while in the photoelectric effect, the incoming photons produce ,eventually, some electrical current.

Jumping to the ground state from an excited state yields, in Hg, photons at 185 nm (12 per cent) and 254 nm (85 percent) leaving very little room for emission in other discrete coulours in mercury (around 3 % altogether!).