LED: Is it Really a More Efficient Future?

Tang, Xiang

Due to the partial unavailability of renewable energy sources, energy efficiency in today's world is more important than anything else. Less energy consumption meaning less fossil fuels will be consumed. Lighting takes a great percentage of today's energy consumption, therefore it is very important to choose the more efficient lighting source option. It was hypothesized after researches, that between two of the most efficient lighting sources on the market, LED chips and HID Xenon bulbs, HID bulbs will have a significant higher efficiency than LED at high wattage lighting (when output power reaches 100W. Ex. street/outdoor lighting) while LED will have a higher efficiency at low wattage lighting (output power<100W. Ex. indoor lighting) due to LED's high thermal production by great amount of resistance at higher electrical current since LED uses lower voltage source than HID Xenon does. This hypothesis was then proven correct after the experiment has been performed. Experiment was performed by placing LED bulbs 1m away, perpendicular to the lux meters, turn to 100W output power and measure the lux of the light, then convert measurements after a series of calculations to Lumens (since lumens cannot be directly measured). Then repeat the process with HID bulbs, record the data. Lumens was then converted to lumens per watt. Experiments was done at three wattage levels, 20W, 50W, and 100W. Results have shown that at 20W, LED has 9% more efficiency than HID, at 50W, LED has 3% more efficiency than HID, but at 100W, HID shows a 6% more efficiency than LED. This experiment concludes that for indoor lighting, using LED is more efficient than HID. While for outdoor lighting, such as street lighting, stadium lighting, construction lighting, HID is more efficient than LED.

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