

LED Lighting System Technology Trend & Market Forecast (2012-2020)

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Abstracts

LED lighting system market moves into high gear. LED lighting system market to reach \$55 billion by 2020

The LED lighting market is hitting its stride, boosted by governmental efforts to support the energy industry, including LED lighting, through support programs and regulatory reforms. LED lighting systems are next-generation lighting systems, whose concepts are based on cross-industry collaboration that enables remarkable energy savings through convergence of IT technologies and LED luminaires and provides multi-function solutions, including human-centered, eco-friendly, and customized contents.

Based on these features, LED lighting systems are bringing about a paradigm shift in the lighting industry. LED lighting systems are an epoch-making technology that can maximize the energy saving effect of LED luminaires and respond to user's emotional reactions.

In general, it is known that shifting typical LED luminaires into system luminaires enables further energy savings by 50% through integrated intelligent management, connection with sensors, and customizable control.

Thus, it is expected that the commercial sector will play a crucial role in forming the LED lighting system market in the initial stage, starting a ripple effect to other sectors such as industry, outdoor, and residential sectors.

The LED system luminaire market is expected to get into shape between 2013 and 2015 and start to grow rapidly from 2016. The estimated penetration rates for each sector by 2020 are as follows. Considering governmental policies and increasing

electrical tariffs, it is expected that the industrial sector will see the biggest growth, reaching about 18% of the industrial LED lighting sales in 2020.

The penetration rate of the commercial sector is expected to increase up to the Energy Management System (EMS) installation rate (18% of the entire buildings in the U.S.). This can be more accelerated depending on each government's programs and regulations on commercial buildings. Especially, it is expected that Building Energy Management Systems (BEMS) will also contribute to driving the market growth.

The LED lighting system market is expected to kick into high gear around 2013 and start to grow rapidly from 2015. In terms of revenue, the market is expected to reach \$55 billion by 2020, from a mere \$93 million (2012), with a high growth rate of 92.4% CAGR.

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About

Unlike fluorescent lamps containing mercury, LEDs are eco-friendly product with a long life of over 50,000 hours. Furthermore, they have higher electrical efficiency by 90% than that of incandescent lamps. Thus, the lighting market is undergoing big changes such as the EU-wide ban on incandescent bulbs that came to effect on September 2012. Existing luminaires are energy guzzling appliances whose visible light emission rate is as low as 3-30% and system efficiency 0.3-20%. LED traffic lights, for instance, which are widely being used, can improve system efficiency from 0.3 to 3% along with 90% energy savings.

LED lighting, which use small LED devices, can be developed and designed in various sizes according to the amount of light required. Besides, LED lighting can be produced in small and solid structures, because it does not require such structures as glass tubes required for existing lamps. Unlike existing glass bulb-type light sources, LED lighting use solid-type small spot light sources, each of which has a very small optical output despite a high level of solidity and a long life. It generally lasts 4-50000 hours, which can be a great merit in terms of maintenance compared with thousands of hours of existing light bulbs.

Based on the concept that the resistance of the device is fixed, two methods are used to control optical outputs: controlling power supply voltage and pulse deration modulation with constant power supply voltage. Simple lighting fixtures such as traffic lights are designed to maintain voltage to a certain level through voltage control or complex lighting fixtures such as electronic displays, which are supposed to reproduce various levels of brightness and colors, use the pulse duration modulation method, wherein a luminance output is proportional to the applied duty cycle.

Existing candescent lamps requires warm-up time for heating filaments after power is supplied before light emission. This is approximately more than 0.2 seconds. On the other hand, LEDs emit light immediately as electrons and charges are combined once power is supplied. This instant-on characteristic is expected to have great effects, when applied to special luminaires.

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