Brainstorm - Solid State Lighting

Solid state lighting offers greater energy efficiency, as well as what are now still long-term cost benefits. Here, industry experts comment on the biggest challenges in the design and manufacturing of LED illumination and what is needed to make the widespread adoption of LED illumination by design engineers a reality. Follow the links to read the complete commentary.

Peter Resca, Astrodyne

[1]"LED illumination is rather unique, in that it is not relegated to a niche industry. It applies to new technology across a broad variety of markets...I believe design engineers and suppliers must understand target markets in order to provide effective solutions. Widespread adoption will occur as the price point for LEDs continues to fall while their light output simultaneously increases. Another design challenge is to develop a method that utilizes the existing AC voltage infrastructure. By their nature, LEDs work from a current-controlled DC source. Since traditional sockets or ballasts are incompatible, engineers are challenged to develop a solution that resolves this issue. "Price point reductions and simplifying installation will play a key role in accelerating implementation. The general illumination market is cost competitive, and LED solutions must close the current price gap. Once this is accomplished, users will grow to appreciate the added advantages of LEDs. Extended life, the complete elimination of chemical contaminants and a failure mechanism that results in the gradual

James Loeffler, OSRAM Opto Semiconductors

[3]"With rapidly increasing efficiencies and cost per lumen decreasing initial cost of LED light will become less of barrier. As the life cycle cost of LEDs beco better understood, advantages like small s better energy efficiency, longer life, mercu and negligible spontaneous failure rates w to rapid penetration into new applications "Quality of light" is becoming an increasin important metric. Improved color renderin proper selection of CCT, and color uniform improve the visual perception and appeal lighting.
Industry infrastructure to support the use must continue to expand to meet the grow demand. Availability of optical, thermal, d control, and assembly solutions to work w LEDs is critical to enable end customers to advantage of the technology. ." more... [4

reduction of light output...will act in concert to facilitate wide-spread adoption of LED illumination." more... [2]

Mike Petagna, ROAL

[5]"...In the U.S., 22 percent of energy is consumed by lighting. As a result, more attention is being placed on energy-efficient lighting systems, more specifically LEDs...LEDs do not radiate heat; instead 80 percent of the dissipation of the LED is conducted, and special processes are required to mount LEDs to maintain reliability and thermal conduction. LEDs require drive circuitry, so choosing the correct driver will differentiate performance of the whole system. Optic design also contributes to light loss reduction by focusing the visible light.

"For widespread adoption, there must be “ease of use” of the technology and a practical cost...Unfortunately, the cost for LEDs is still high and takes up over 60 percent of the total cost for many “line voltage” LED light engines. "To proliferate this technology, safety agency adoption of LEDs and standardization of systems must occur..." more... [6]

Mark McClear, Cree, Inc.

[8]"LED technology has been on the radar screen of the lighting industry for a few years now, but the conventional wisdom has been that bright, efficient, and cost-competitive white LED light was still a few years away from reality. All that changed in the last 12 months, as collectively, the LED companies have blown the doors off the predicted technology roadmaps, and the first entrepreneurial lighting companies

Sameh Sarhan, National Semiconduct Corporation

[7]

Despite the rapidly increasing adoption of by the electronics industry, the change is from complete....As with all things new, at this promising performance is associated high premiums which may obstruct the LE deployment in cost-sensitive markets such general purpose lighting.

"LEDs materials are not rated for a high operating temperature, and, as a result, relatively complex thermal management a packaging techniques might be needed to maintain consistent high performance. On other hand, LEDs are inherently current-dr devices, and, therefore, boosting up their output requires higher drive currents whic turn, may necessitate the use of relatively intricate drivers. ...." more... [7]

have responded by fielding several notable, high-quality, LED-based luminaire products that deliver tangible advantages versus traditional bulb technologies.
"Now that small arrays of high-power LEDs can match the light output while exceeding the efficacy of most incumbent light sources, the design challenges have shifted to the driver circuit, thermal management, and secondary optic engineering disciplines....LED light output and lifetime degrade rapidly in the absence of good thermal management, and the advantages of an LED that lasts for decades can be neutralized if the driver circuit is not at least as reliable as the LED. Engineers with the skills to deliver these designs will become critical to lighting fixture companies that have heretofore not had to put as much emphasis on these disciplines. more... [8]

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