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U.S. DEPARTMENT OF ENERGY

July 5, 2016

A New Report and Webinar on OLED Lighting Products

DOE has just released an informative new market study on OLED lighting, entitled *OLED Lighting Products: Capabilities, Challenges, Potential*. A related webinar will be held on July 28 from 1:00–2:00 p.m. EDT. The second report in a series of three, the new one follows a recent GATEWAY field study documenting the installation of OLEDs as ambient lighting in an office, and will in turn be followed by a CALiPER analysis of commercially available OLED products, based on photometric testing and product teardowns.

The new report focuses on the potential for architectural OLED lighting, describing the current state of available products and detailing the technology and market hurdles that prevent wider use of OLEDs. Most importantly, it tries to bridge the communication gap between the needs and goals of OLED manufacturers, the product needs of the lighting specification community, and the needs of luminaire manufacturers in committing to OLED products. Addressing a range of lighting-quality issues, it concludes with a list of performance features that may inspire the market to develop components and luminaire offerings that will increase application opportunities and adoption of OLEDs.

At present, OLED lighting panels employ flat glass substrates and are approximately 100 mm square, although the range of sizes and aspect ratios is growing. An exciting opportunity is the potential to use thin, flexible substrates of glass or plastic to provide panels that can be curved, rolled, or even folded. As these technologies evolve and the price to implement them drops, non-rigid OLED lighting products may offer a competitive advantage over LED and other lighting technologies. Right now, OLEDs' main competition is edge-lit LED panels, which offer similar appearance and superior performance in several respects, including cost — but at the sacrifice of panel thinness.

So far, OLED panel efficacies have been disappointingly low for architectural applications, restricting their use to decorative elements rather than the principal light sources in a building, because their energy performance is still half or less of the equivalent fluorescent or LED lighting system, and the pressure to meet energy codes in the architectural market is so high. On the other hand, OLED color characteristics are superior to those of early LEDs. With further efforts to improve red saturation and overall

gamut, OLEDs could meet color-quality needs even for demanding hospitality interior spaces.

While OLED panels themselves are thin, lightweight, and deliver a unique quality of light, the drivers are still relatively large and brick-like. Because they don't fit gracefully into the OLED luminaires or mounting canopies, they must be mounted remotely. That poses extra work for the designer and contractor to find an accessible location hidden from normal view, where drivers (and in some cases, transformers) can be located in compliance with the electrical code. For OLEDs to fulfill their promise, driver elements will need to be integrated sleekly and discreetly into the luminaire or mounting elements. There's currently only one dedicated OLED driver on the market, because driver manufacturers don't see a growing potential OLED luminaire market. So luminaire manufacturers have had to work with LED drivers, customizing them as best they can to deliver the current and voltages needed, often outside the optimized efficiency range of the driver — resulting in the driver being a weak point in system efficacy.

What's more, there's a catch-22 at play, in that economies of scale are needed to reduce the cost of manufacturing OLED panels, but the costs are currently too high to achieve the widespread adoption that would incentivize investment in higher-capacity manufacturing. For full viability of OLED architectural lighting, products will need to deliver higher efficacy, better system components, and lower costs.

OLEDs are in their infancy compared to LEDs, but the architectural market is taking notice of a lighting product with an entirely different look and function. The early years of LED lighting were fraught with difficulties — including low output, rapid light decay, poor color, short life, driver failures, flicker, clumsy connectors, and no standards. OLEDs are struggling through a similar set of difficulties, but OLED manufacturers are benefiting from having watched and learned from the LED industry's working through these problems.

OLED systems are increasing in efficacy, but in terms of cost, energy performance, high color quality, dimming performance, optical performance, and standardized, interchangeable components, they're not yet within the range that would make them viable and desired as lighting products. With rapid advances in these areas, OLED technology could become the complementary solid-state counterpart to LEDs as a dynamic and softly luminous building material — giving designers and engineers a new tool for creative and effective lighting.

For more details, download the full report. Click here to register for the webinar.

Best regards,
Jim Brodrick

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.