

Brainstorm: Optoelectronics

Edited by Jason Lomborg, Technical Editor

Will this be the year of solid state lighting?



Brian Moody, Cypress Semiconductor, www.cypress.com

[1]

It depends on the segment and is ultimately dependant on energy consumption. The commercial segment will be the first to adopt as the financial benefit for switching over is the greatest for high energy users. As an example, Macy's is retrofitting over 10% of their stores nationwide with LED replacement lamps and saving 16,200 Megawatt-hours a year, which is real savings as companies continue to look for ways to manage costs. The adoption will be slower in the consumer segment. Clearly, progress has been made with a number of quality dimmable LED lamps introduced in the past six months at Home Depot and Lowe's, ranging in price from \$20 to \$50. Pricing will continue to drop as lamp manufacturers benefit from economies of scale and rebates /subsidies transition away from CFL towards LED lamps. However, further work is needed to get consumers over the mental hurdle of purchasing something that they haven't historically thought much about. The average consumer will struggle with outlaying the upfront cost in exchange for 2-3 times that amount in the form of savings on their electricity bill over the product's life.



Michael Kretzmer, ERG Lighting, www.erglighting.com

[2]

This is definitely the year of solid state lighting in the markets of display backlighting and refrigeration lighting. They have embraced LEDs to such an extent that it is difficult to find new designs that utilize previous technologies. However,

the SSL industry is still in the early stages of development. An abundance of products, but a lack of standardization, high initial cost, and the suspect quality of some early entrants are still hurting the adoption rate.

Regardless, a big boom is on the horizon for applications that really benefit from the advantages inherent to solid state lighting: street and parking lighting which will be followed by high-end architectural and cove lighting. This is particularly true in the commercial and municipal sector, where organizations are more inclined to look at the long-term ROI (including maintenance costs) than in the residential sector.

From our perspective as a power supply manufacturer, the ability to design and manufacture LED drivers with MTBFs and warranties that match those of the other components of SSL luminaries is crucial. To alleviate the uncertainty surrounding solid state lighting performance, ERG has developed a line of drivers of the highest quality, designed and manufactured in the USA. With over 30 years of experience in the backlighting industry to draw upon, we feel we will do our part in removing some of the barriers that still exist in the adoption of SSL solutions.



Brett Shriver, Global Lighting

Technologies, www.glthome.com [3]

Whether you could define 2011 as “the year of solid state lighting” is a matter of opinion and perspective.

At GLT, we have been seeing a huge increase in the use of our LED-based edge-lit lightguide technology for new general lighting solutions beyond the LCD backlighting applications that we have traditionally served. This includes all manner of egress lighting, downlighting, task lighting, refrigerator lighting and so forth. This is projected to be one of our largest growth sectors this year and we have begun production on one of the first consumer based LED downlight fixtures in Japan.

Cost is still a barrier, though not on the commercial side as much as in the consumer arena. We are finding that many commercial applications are more accepting of the higher upfront cost of LED products in order to offset future power and maintenance costs. More companies are starting to realize that they can't simply replace their existing lighting by plugging LEDs into the same package and footprint rather than starting from scratch and developing product to take advantage of the full benefits of LEDs.

As far as consumer applications go, however, without governmental mandates or initiatives, adoption of SSL lighting will happen slowly and could take 10 to 20 years to reach full replacement of incandescent and fluorescent fixtures.



Dr. Michael Fiebig, OSRAM Opto Semiconductors, www.osram-os.com [4]

At OSRAM, we have seen a huge increase in LED-based solid state lighting in 2010 and we expect LEDs to continue to make major inroads into general lighting in 2011 to 2013. In the short and medium term, we already see LEDs being used not only for architectural lighting but also in shop and office lighting and in outdoor applications that require high reliability, efficiency, and unique features such as interactive dimming and color control.

There will be immense growth in LED-based solutions for a variety of applications. This year, we have seen a rapid increase in general lighting applications, such as professional lighting systems for offices and streets. Their use in shop lighting will increase, and LEDs will break through into the residential sector. Today's largest area of application, architectural lighting, will be overtaken within a few years by applications such as retrofits in applications that make use of directional LED light (downlights, spotlights, etc.).

There will be a wide range of energy-efficient LED-based solutions for the public and private sectors, intelligent solutions with sensors for lighting control (presence sensors, mood lighting), and a variety of products for applications with special requirements in terms of the quality of light (shop lighting, museums, etc.).

We also anticipate an enormous increase in efficiency -- to ~150 lm/W at the component level -- as well as continued reductions in price from 2010 levels in 2011. LEDs will continue to evolve in terms of higher current carrying capacity, the availability of a broad range of application-oriented solutions, and increasing standardization that will make LED lighting easier for luminaire manufacturers and end consumers to master. Looking ahead, increased penetration of conventional lighting solutions will continue in 2011 and beyond.



Richard Halliday, Lumex, www.lumex.com [5]

Solid state lighting will continue to be the fastest growing space in the LED market and will continue to encroach upon traditional lighting such as incandescent and fluorescent for several reasons. First, continued regulation and support for green initiatives will mandate that more efficient and less power hungry lighting solutions be made available to the general public. Second, price per watt will continue to decrease, making adoption in applications such as municipalities that require regular maintenance to be much more attractive and rapid because the cost savings are realized very quickly. Finally, many ancillary technologies that support LED lighting, including optics, thermal management, interconnects and housings, are now able to be seamlessly integrated into a user friendly product.

Challenges that remain include widespread education for the selection and installation of high-quality, high-performance solid state lighting products that meet minimum standard requirements for the application and ultimately exceed the end user's expectations. In 2011, the lighting market will continue to see new emerging leaders offering standard bulb replacement products, as well as innovative specialty lighting solutions for niche applications, all of which will contribute to the inevitable domination of solid state lighting and allow it to continue to grow at an exponential rate.



Simon Wyre, Lascar Electronics, www.lascarelectronics.com [6]

To answer the question, we need to agree what would mark out 2011 as special. Over the past few years, there has been a steady increase in the use of LEDs in all types of lighting applications but this has been largely limited to specific areas such

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as automotive, signage and LCD backlighting. In general illumination applications, the main uptake has been in public and street lighting but only where new or complete replacement lighting has been installed.

What I believe to be the 'killer app.' for LEDs is domestic lighting. To date, CFLs have been promoted heavily in commercial and legislative terms but the buying public has been reluctant to totally convert because of cost, limited color spectrum and lack of dimmable versions. Much the same can be said for LEDs. The challenge facing LED suppliers is to compress enough LEDs, a light diffuser and control and cooling systems into a conventional ES lamp envelope and make it work the same as a filament lamp. There are offerings in this format and more commonly in GU10 and MR16 halogen replacements but is this the way to go? In the short term, the answer must be 'yes' because of the sheer number of existing installations but in future, formats will be used which better suit LED technology. Considering the longevity of LEDs, do they need to be produced in a replaceable format such as the Helieon system or will the main market be in complete LED luminaries? Only time will tell.

Cheryl Ford, Osram Sylvania, www.sylvania.com [7]

Solid State lighting will have a major impact on lighting choices in 2011 due to the availability of high brightness, high efficiency LED products. Components manufacturers need to be fully engaged with the system solution providers. Complete luminaire system solutions incorporating LED modules, power supplies and controls into lighting fixtures will make it easier to specify LED lighting. Although still more expensive than traditional luminaires, LED lighting has many application benefits including significant energy savings up to 80% over incandescent in recessed down lights, up to 50% energy savings over fluorescent in refrigeration/freezer cases, adds sparkle to jewelry display cases and provides better lighting uniformity for street/parking lot lighting. For general ambient lighting, the ROI is not there yet. LED lighting is the 'greenest' lighting choice due to its long life, reduced energy consumption and no mercury.

The biggest challenge with LED lighting will be insuring that quality products are installed to prevent dissatisfaction. Lighting specifiers should request LM-79 and LM-80 data to ensure fixture and life performance. UL certification of the fixture is a must to meet electrical codes. Also, many utilities are offering LED fixture rebates that will reduce the initial cost of the fixtures and improve the ROI of a project.

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