

LED Industry Growing with Display Backlights

Paul Semenza, Senior Vice President, DisplaySearch



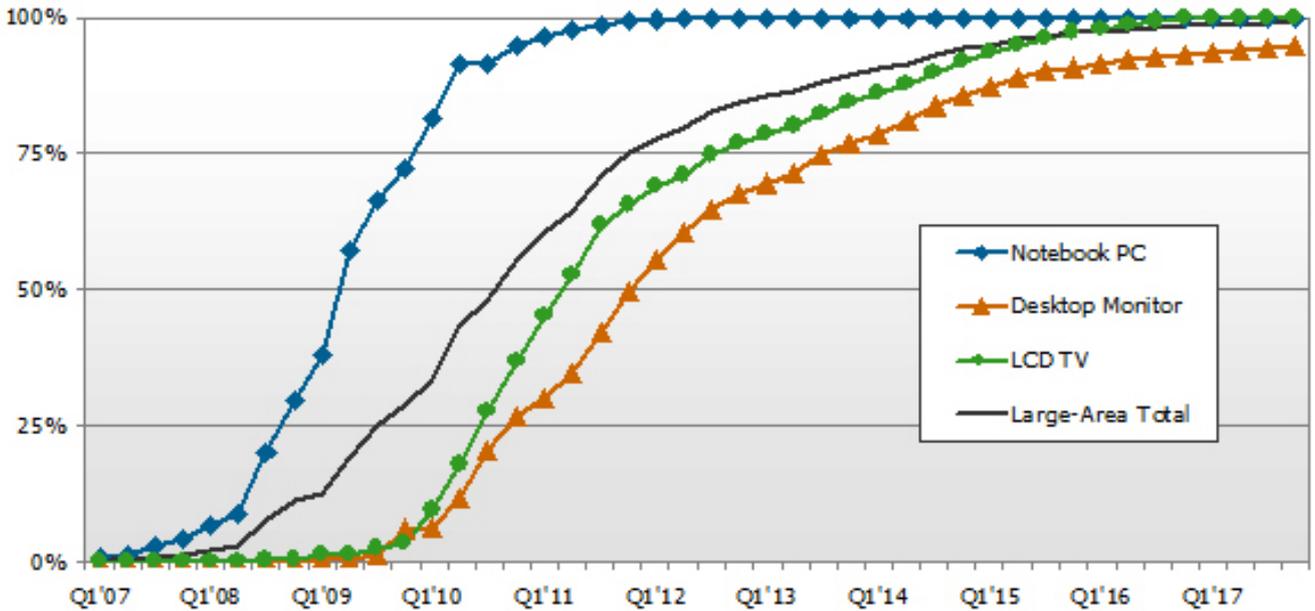
Light emitting diodes (LEDs) have served markets such as automotive lighting, signage, and indicators for many years. The LED industry entered into a new phase in 2010, as the market for LED backlights in large-area liquid crystal displays (LCDs), particularly for TV, took off. At the same time, the industry is looking ahead to an even larger market, general illumination. This rapid growth has been enabled by the ongoing cost reductions and performance improvements in LED performance over the past two decades. At the same time, the larger size and more demanding requirements (most notably in terms of cost) of these new markets are having effects on the industry structure and driving new technology developments.

The properties of LEDs – solid state devices that with narrow and accurately controlled spectrum, fast response time, rigidity, low power consumption, high efficacy, and long lifetime – are transforming the LCD industry and enabling a switch from the legacy CCFL backlights. LED backlights allow for faster switching of the display (higher frame rates), wider color gamut and higher contrast, in thinner and lower-power packages. Led by notebook PC displays, LED backlights are taking over the key applications for large LCD panels (Figure 1).

LED Industry Growing with Display Backlights

Published on Electronic Component News (<http://www.ecnmag.com>)

Figure 1: LED backlights are used in more than half of all large-area TFT LCD panels



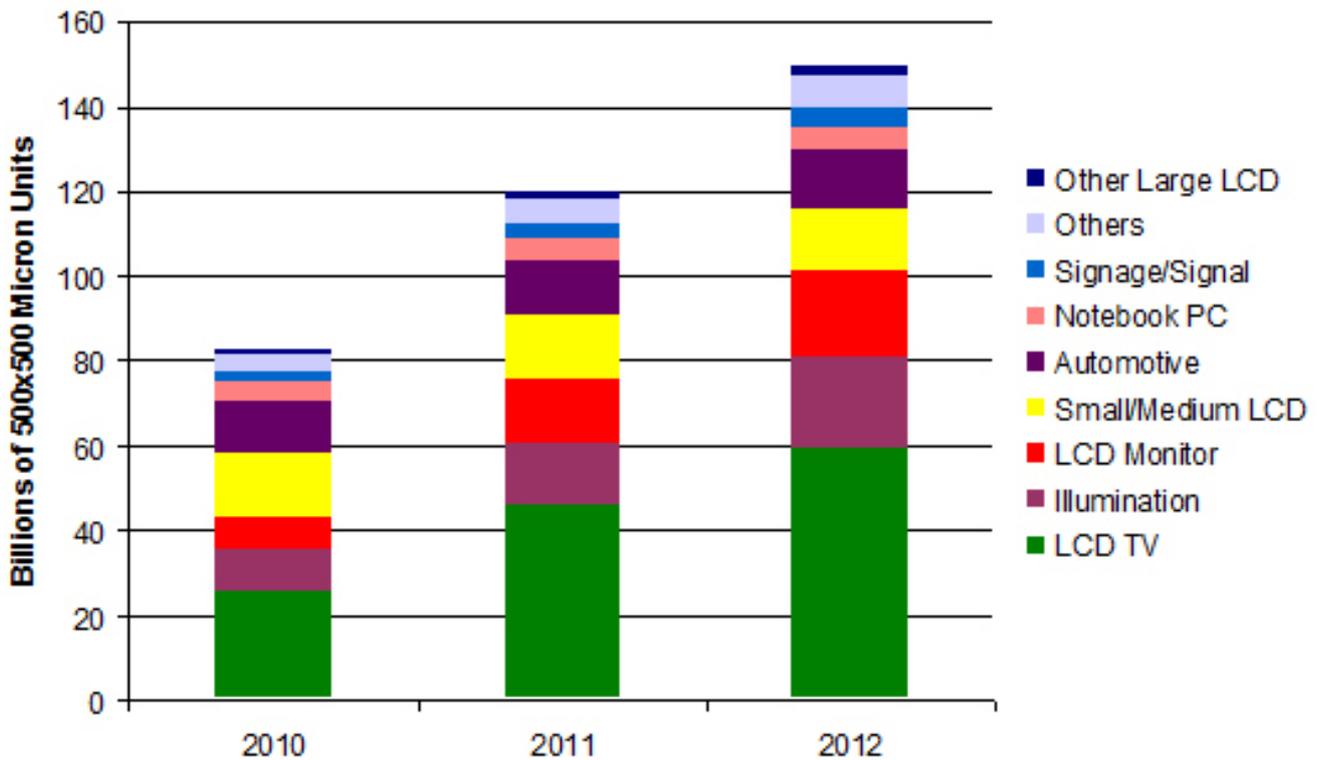
Source: DisplaySearch Quarterly LED Backlight Report

The conversion of LCD TVs, which are much larger than notebook displays and thus require more chips, to LED backlights is currently driving the demand for LED chips (Figure 2). The scale of manufacturing is increasing to meet this new demand; as it does, efficiencies are improving and costs are falling. This in turn is making LEDs more attractive for lighting applications. While LEDs are not yet competitive for most architectural lighting applications, street lights and outdoor illumination are regarded as key lighting markets for LEDs. In these applications, initial installation and ongoing maintenance costs can be quite high, so the long lifetime of LEDs can make the lifetime costs quite competitive. In other lighting markets such as automotive, conventional bulbs and halogen lamps have been replaced with LEDs due to benefits including low power consumption, compact design, and long life.

LED Industry Growing with Display Backlights

Published on Electronic Component News (<http://www.ecnmag.com>)

Figure 2: Total LED demand will pass 100 billion chips in 2011



Source: DisplaySearch Quarterly LED Backlight Report

As the LED industry has geared up to pursue the display and lighting markets, incumbent makers have focused more on the opportunity to expand downstream, particularly into lighting, leaving the display backlighting market somewhat open to new entrants. Longstanding market participants include Nichia, a leading developer of low current white LED along with YAG phosphor technology and IP, as well as Cree, OSRAM and Philips Lumileds, first-tier LED makers of high-power chips, targeting lighting applications. OSRAM is also leading the exterior automotive LED market with high power technology.

Given the traditional strength of Japanese companies in mobile device and notebook PC displays, and the longstanding use of LEDs in these devices, Japanese LED makers including Nichia and Toyoda Gosei have established dominant positions in side view LEDs for mobile phone and notebook PC applications with low forward voltage technology. However, the rapid shift in backlight technology for LCD TVs and monitors created more demand than could be handled by the existing suppliers, who also viewed these applications as commodity markets. Thus, to secure supplies of LEDs for backlights, nearly every panel maker, including Samsung, LG, AUO, and ChiMei Innolux, has entered LED manufacturing through shared investments, joint ventures, or setting up new companies.

Until 2010, the LED industry grew through development of multiple applications, including automotive, mobile phone backlight and keypad lights, and notebook PC display backlighting, as well as indicators, signage, and illumination. With the rapid adoption of LED backlights in LCD TVs and monitors, the industry is undergoing a

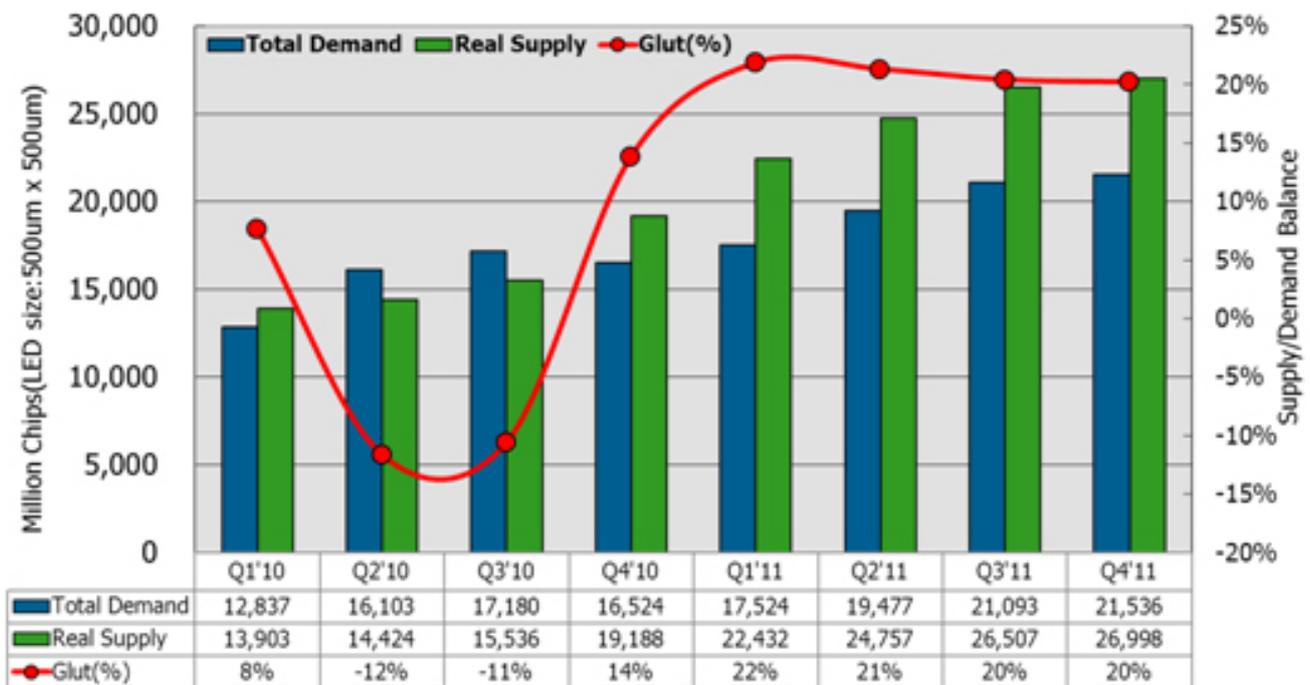
LED Industry Growing with Display Backlights

Published on Electronic Component News (<http://www.ecnmag.com>)

boom in investment, and new companies are entering the market. Developments in manufacturing, materials, and packaging have all contributed to the increased output and falling prices for LED devices, which in turn is what made the widespread adoption in display backlights possible. But the increased scale of manufacturing is driving additional improvements in LEDs, and ongoing materials and process development will likely further performance. This will open up the ultimate market for LEDs, general illumination.

One note of caution for the industry is that the level of investment, particularly in the key equipment area of MOCVD (metal oxide semiconductor vapor deposition) appears to be running well ahead of demand at this point (Figure 3). There is excess supply in all LCD backlighting markets other than notebook PC displays, where there are limited suppliers. LCD makers are requesting high intensity LED chips in order to reduce the total number of LED packages. However, high intensity LEDs have a low yield ratio. In lighting, there is excess supply in most applications, other than street lights, where there are limited suppliers.

Figure 3: Global LED Supply-Demand for Backlit and Lighting Applications in 2011



Source: DisplaySearch Quarterly LED Supply/Demand and Technology Report

In general, the market growth and level of investment are both growing rapidly, and LEDs are still in a regime in which cumulative production and new manufacturing technologies lead to continuous cost reductions. This enables growth in new applications, and it appears that this virtuous cycle will continue for the next few years.

Source URL (retrieved on 05/22/2013 - 11:06pm):

http://www.ecnmag.com/articles/2011/06/led-industry-growing-display-backlights?qt-video_of_the_day=0

LED Industry Growing with Display Backlights

Published on Electronic Component News (<http://www.ecnmag.com>)
