

White LED Market for Lighting 2008: Key Research Findings

~Advancing from experimental stage to commercial stage, establishing a firm position in the entire white LED market ~

➤ **Research Outline**

Yano Research Institute has conducted a study on the market of white LEDs for lighting applications according to the following research outline.

1. Research period: From August 2008 to December 2008
2. Research targets:
White LED manufacturers (of elements and/or packages), lighting equipment manufacturers, corporate users of lighting equipment (22 firms)
3. Research methodologies:
Face-to-face interviews with relevant personnel by our specialized researcher were primarily employed, being supplemented by interviews via telephone and e-mail as well as literature research

<What is the white LED market?>

White LEDs (light emitting diodes) could be used for wide variety of applications and are primarily used for small LCD backlights for mobile phones and backlights for notebook PCs at the moment. It is expected that the market of white LEDs is expanded in the field of lighting applications in future.

◆ **Global market size of white LEDs for lighting exceeded 40 billion yen in 2008, which is 11.7% of the total white LED market.**

The white LED for lighting expanded its range of applications due to the drastic price decrease, and the global market scale in value in 2008 turned out to be 40.2 billion yen. This shows that the market for white LEDs for lighting has grown to 11.7% of 344 billion yen of the world wide market for the total white LEDs in 2008.

◆ **Efficiency improvement and price reduction have been progressed largely for the power LEDs.**

Until recently, luminous efficiency of power LEDs (with rated current of over 300mA) had been several steps behind that of the low-power LEDs (with rated current of around 20mA). However, since efficiency of power LEDs has improved in addition that its price has been lowered, the unit flux price as the performance value to measure the ratio of light source brightness versus cost is forecasted to exceed that of the compact fluorescent lamps.

◆ **Global market size of white LEDs for lighting is forecasted to be 413 billion yen in 2013 and 708 billion yen in 2018.**

It is forecasted to be around from 2010 to 2012 when unit flux price will decrease to less than 1 yen/lm, which should be the measure of popularization of white LEDs for lighting. Development of lighting applications of the white LEDs has been continuously progressed and already covered widespread areas, many of which are something forward-looking.

➤ **Report format:**

Published report: "White LED Market: Lighting Applications 2008"

Issued in: December 2008

Language: Japanese

Format: 209 pages in A4 format

Price: 120,000 yen (6,000 yen of consumption tax will be additionally charged for sales in Japan.)

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✦ Research Summary

1. Market overview

- Global market size for the white LEDs for lighting in 2008 was estimated to be 40.2 billions in yen value and 326 millions in quantity.
- Global market size for the total white LEDs in the same year was estimated to be 344 billions in yen value and 19 billions in quantity. Percentage ratio of the white LEDs for lighting to the total white LEDs was 11.7% in terms of value and 1.7% in terms of quantity.
- The percentage ratio of the market for the white LEDs for lighting to that for the total white LEDs had been around 3% in value until the period between early 2000 and 2005, when the white LED market rapidly grew, and it increased steadily to 7.2% in 2006, to 9.2% in 2007 and finally to over 10% in 2008.

2. Noteworthy market trends

- The market for the white LEDs for lighting has been markedly growing in latest years and percentage ratio of the leading manufacturers' annual sales (in value) of white LEDs for lighting purpose has elevated to near 10%.
- Each white LED manufacturer tends to focus on such applications as backlights for notebook PCs and backlights for LED TVs, and the lighting applications are supposed to have been the ultimate goal to be achieved after those foregoing applications. On the other hand, some manufacturers have already shifted their focus to lighting applications, the sales ratio of which exceeded 70% of the total white LED sales. The market for the white LEDs for lighting applications has made substantial progresses and it started to be positioned as the next core business theme for many industry players.
- The LED system base lights for office buildings, which are supposed to have long been the application field with high hurdle, have already been commercialize and introduced into the market. The product is so efficient that it realizes the same brightness as 90W (45W x 2) fluorescent lamps with only 38W, and it is expected that the LED lights cover an entire building in near future.
- The power LEDs with over 300mA of rated current have been extremely inefficient compared to the low power LEDs with 20mA of rated current for a long time. However, the efficiency has been greatly improving and the high-end power LED (with rated current of 350mA, 1W class) in the market finally achieved 105 lm/W of luminous efficiency*.

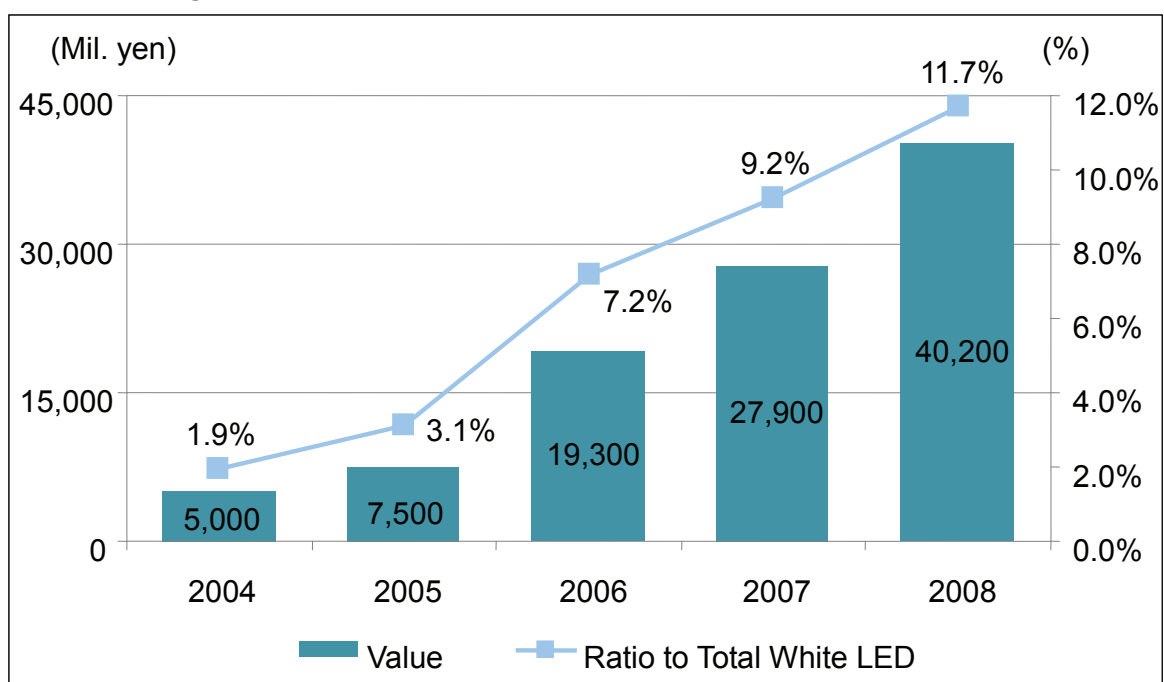
*NOTE: The luminous efficiency is expressed in lm/W and represents efficiency of light sources. The luminous efficiency of LEDs is calculated based on total luminous flux per package divided by wattage (power consumption).

3. Future prospects

- The luminous efficiency of the power white LEDs with 300mA to 350mA of rated current is forecasted to reach 170 lm/W in five to six years.
- The unit flux price*¹ of white LEDs is expected to be reduced to 1 yen/lm in five to six years, which is almost equivalent to that of the compact fluorescent lamps, and further to 0.2 yen/lm in ten years.
- Development of application of the white LEDs to lighting equipment has been already progressing broadly, but most efforts are still something experimental or forward-looking and the full-fledged development of the market is yet to come.
- The global market size for the white LEDs for lighting applications is forecasted to be 413 billion yen in 2013 and 708 billion yen in 2018.
- The market of the white LEDs for lighting applications octupled from 5 billion yen, the figure in 2004, to 40 billion yen in four years up to 2008. The market is further growing to ten times as much as the figure in 2008 in the following five years.

NOTE 1: The unit flux price is a performance value that represents light source brightness versus price. Its is calculated based on the price per package divided by total luminous flux and is expressed in yen/lm.

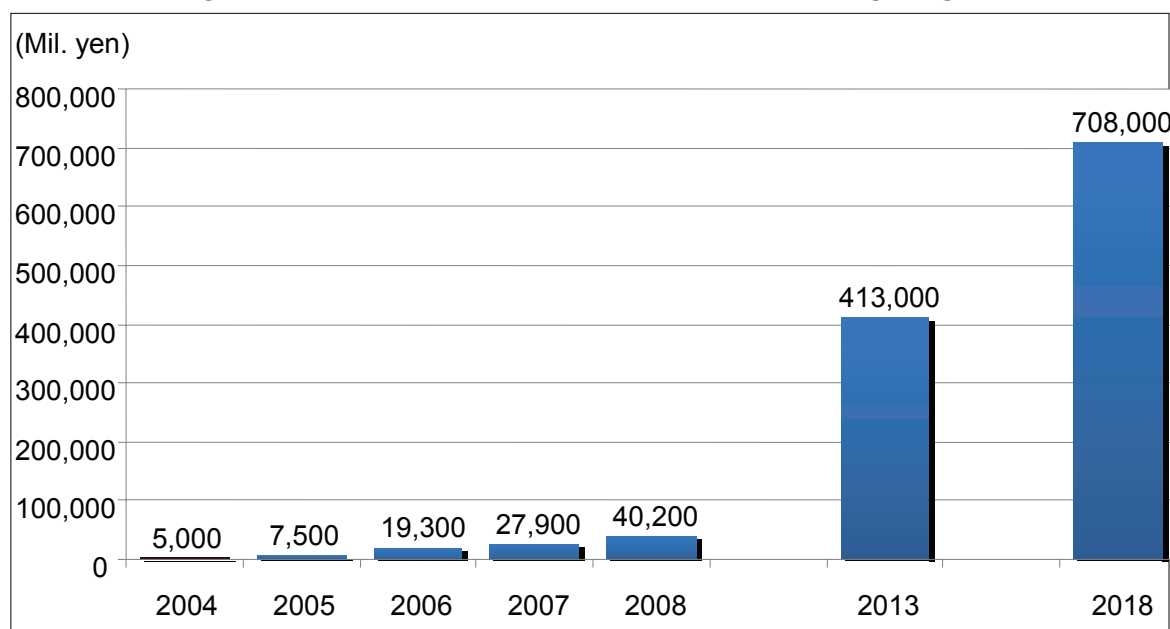
Figure 1: Global Market Size of White LEDs for Lighting and Its Percentage Ratio to the Total White LED Market



Estimated by Yano Research Institute

NOTE 2: The left axis indicates the market size based on the manufacturers' shipment value and the right axis indicates percentage ratio to the total white LED market.

Figure 2: Global Market Size for White LEDs for Lighting



Estimated by Yano Research Institute

NOTE 3: The above figures are based on manufacturers' shipment value.

NOTE 4: The figures for 2013 and 2018 are the forecasts.