

CURRENT STATUS & FUTURE OF LED BASED LIGHTING SYSTEM

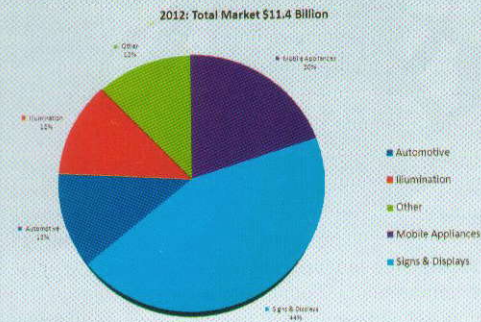
DR. BHUPENDRA BIMAL CHHETRI .MR. DIWAKAR BISTA

BACKGROUND

OVER THE past hundred years, incandescent and gas discharge technology occupied almost all general lighting applications. Light Emitting Diodes (LED) has introduced new notion in the field of lighting and is considered to be one of the most viable lighting solutions. Right now, LEDs in lighting are still a bit of a gimmick. They are popular and used quite widely, but often they're used just because they are a new technology. Even so, there are already many examples, where LEDs have been used in the retail and leisure markets, and of course we are now starting to see substantial LED installations in general purpose lighting application as well. The use of LED is growing rapidly in developed world in numerous applications. Where as, the developing world is not usually considered a prime market for LEDs but there are an estimated 1.6 billion who lack access to the electricity grid. LED-based lighting systems are considered an excellent option for such people compared with lamps that burn kerosene or other fuels.

MARKET STATUS AND FUTURE POSSIBILITIES

According to LED Magazine, LED market grew by 9.5% in 2007 to reach \$4.6 billion, which is quiet higher than 6% growth in 2005 and 2006. Similarly, growth of 12% is expected in 2008 and compound annual growth rate of 20% in next five year to reach \$11.5 billion in 2012. Currently the use of LED is very much focused to sign and displays, cell phones and automobile lighting. General illumination covers only 7% of total market in 2007.



Illumination sector grew rapidly in 2007, with revenue more than 60% higher than in 2006. Illumination market is expected to reach \$1.37 billion by 2012.

CONTEMPORARY APPLICATIONS

MOBILE APPLICATIONS

Mobile applications occupies largest segment 44% in the market. LEDs are generally used as backlight or indicators in mobile devices like laptop computer, cell phone, mp3 player, gaming devices, GPS devices etc.



SIGNS AND DISPLAYS

LEDs have created a transformation in how electronic signs, message reader boards and signal displays are made. Displays with LED have numerous applications like traffic sign, message reader boards, electronic billboards, spectacular sign displays, sport stadium scoreboards, signaling indicators, large scale outdoor public art etc. These applications occupy 17% of LED market.



AUTOMOTIVE LIGHTING

In automobile, LEDs today are mainly used for secondary functions such as dashboard lighting, turn signals and side-markers. But with the development in high brightness LED, they are now also being used as headlamp in automobile. Current share of LED application is 15% in automobile.



Gallium LED life is rated at 40,000 hours, which equates to twenty years of useful service when operated during regular business hours.

CURRENT STATUS AND FUTURE OF LED BASED LIGHTING SYSTEM

ILLUMINATION

LED still has some drawbacks (high price, low color rendering index, lack of standards etc.), limiting the use of LED for illumination. But still illumination occupies 12% of LED market. Street lighting, general purpose household lighting, decorative lighting etc. are some of the fields where



LED based luminaries are used. Recently Boeing has introduced LED based lighting in their Boeing 787 commercial aircraft.



OTHER APPLICATIONS

There are various other applications like machine vision lighting, lighting for medical and dental observation, phototherapy lighting, marine and airport signaling etc. The application field is no doubt going to increase because LEDs are now being used in areas where two to three years ago they wouldn't have been considered.

CONCLUSION

For widespread use of LED in the field of general illumination and other application significant improvement in performance is demanded. As the LED research and manufacturing community continues to improve the efficiency of LEDs, manufacturers should go beyond talk of lm/W (lumen output per watt), and instead quantitatively describe system performance. They also need to be able to evaluate other characteristics such as Color Temperature, Color Rendering Index and glare by the same standards used for other products. With all the requirements fulfilled, LEDs will undoubtedly replace conventional luminaries and may stand alone in the lighting application.

The authors from Department of Electrical and Electronic Engineering are members of Asia Link Project ENLIGHTEN.

SEEE ACTIVITIES

Society of Electrical and Electronics Engineers SEEE has been actively involved in improving the personal and professional qualities of the students. It is a non-profitable, non-political organization established with the motive of volunteering. It coordinates and organizes various welfare activities for the students of electrical & electronic engineering. SEEE conducts social welfare activities and improves interaction among students of other departments of the university and other institutions in Nepal.

Every event of SEEE is purely dedicated towards the holistic development of its members. SEEE started its activities first by appointing its executive board. The board included Bijaya Ghimire as President, Bishal Silwal as Vice-President, Pravesh Kafle as Secretary, Suresh Joshi as Treasurer and other executive members.

The first event of SEEE was the orientation program organized for the first year students on 7 Sept 2007. The welcome program to the first year students was organized in the same month under the supervision of the department. The Dean of the School of Engineering was

the chief guest of the program. On the same program the fortnightly Newsletter of SEEE 'Tech-Brief' was launched.

The most awaited annual event of SEEE, SEEE Running Shield Football Tournament, was held in November. The final deciding match of the league was between third year 'White' and fourth year which the third year won by 2-1.

SEEE also participated in the "Environment Week- 08" which was organized by other clubs of KU. After that, the SEEE quiz contest was organized. Fifteen teams participated and the top four advanced to the final. The final, held on 13 June 2008, was won by Bikram Tiwari and Bibek Shrestha.

After the Quiz, SEEE Girl's Football competition was held on 20th June 2008. The first year and second year students combined against the third year and fourth year students. The senior team won the match by 2-0.

The SEEE annual newsletter "Enchiper" will be launched on the annual day of SEEE.

SEEE thanks all the students and faculty for their support and active participation in its activities.

Global lighting energy use is significant, totaling approximately \$230 billion per year.