LEDs: The future is bright

LEDs are widely used for architectural, entertainment and consumer markets but an equally interesting area is their application in healthcare. A new EU Seventh Framework programme (FP7), Project Hercules©, promises to advance the technology in this area and the general lighting markets.

LEDs for the healthcare sector

In the medical lighting market LEDs have really made their mark. At first sceptical about the use of LEDs in lighting, the industry came to realise many of the benefits that LEDs could bring over conventional tungsten or xenon lighting. Reduced maintenance requirements, low levels of IR and fully adjustable, visible light output all appealed to the medical lighting sector. Such qualities enable medical staff to change colour balance, focus and intensity to improve the surgical observation of body tissue or tumour types.
To prove this trend Brandon Medical, a leading UK medical technology company, started to use solid state LEDs created by Sagentia in 2007 in its medical lighting equipment for major and minor surgical applications. The lights are extremely efficient and use up to 60 per cent less energy than with conventional incandescent based medical lighting technologies.

LEDs are also being used by Photocure, a Norwegian specialty pharmaceutical company focused on dermatology and cancer, to deliver photodynamic therapy across a number of treatment areas. Photocure recently developed an LED based device combined with a medicinal product in a treatment that aims to destroy tissue infected by Human Papilloma Virus (HPV) and treat precancerous lesions on the cervix. This device utilises the high energy to light conversion efficiency of high brightness LEDs to deliver effective treatment in a compact, single use disposable package, without damaging healthy tissue. This is a really breakthrough in the treatment of HPV enabling treatment to be quickly and easily administered at point of care and allowing the patient to leave the hospital and continue with her daily activities, before removing and disposing of the device herself. Photodynamic therapy is proving to be an important and growing area of research and application within the medical arena largely due to the evolution of LED technology.

A promising future

Five years ago there were very few useful LED lighting products on the market. Today however, LEDs are displacing many conventional lighting technologies in quite significant areas and this will continue over the next few years as the market evolves. IMS Research predicts that the world lamp and luminaire market will be worth $115 Billion in 2015, up from $83 billion in 2010, stating that increased efficiency standards, a growing concern with energy efficiency and breakthroughs in the LED sector will all affect its uptake.
With growing marketing attention on "Green Products" and initiatives to lower carbon footprint, LED technology has the potential to play a leading role in delivering energy efficiency. This is likely to result in new technologies in the fields of optics, materials, thermal physics and electronic components.

Addressing the barriers to adoption: Project Hercules

With LED technology advancing significantly over recent years, the European Union has recognised the importance of staying at the forefront of this technology and creating the breakthroughs that IMS Research predict. This requires investment to address the existing barriers to LED adoption in the EU and to match if not exceed the commitments being made in this area by the US and Asian markets. This is why the EU Seventh Framework programme (FP7) has funded Project Hercules, a 18 month project that will research and develop all of the core aspects of the technology with the aim of delivering different functionalities, improved performance, reduced cost or a combination.

Whilst it can easily be demonstrated that the extended lifetime of LEDs compared to conventional incandescent and fluorescent lighting, coupled with the high energy efficiency, mean that LED is more cost effective over the life of the product; the relatively high upfront cost is still a significant hurdle that threatens to stop the market from embracing them completely.

Project Hercules will also further look into the key functional aspects of LED lighting such as thermal management, optics, LED sources and electronic drive technology to push the boundaries of what is currently possible to achieve with the technology. This will include examining and assessing how to improve intelligent lighting by better controlling the settings in varying ambient conditions.

The industry must remain committed to LEDs

As a research partner for Project Hercules, Sagentia has always believed that LEDs have the potential to form the basis for new products across all industries. As a result we have been at the forefront of technology development in this field, specifically in the efficient production of high colour quality light using LEDs. Project Hercules gives us the opportunity to work directly with the project partners, which include TWI, Brandon Medical, Diseño y Tecnologia del Molde CUMSA and GRD Segnaletica Stradale di PR. Target S.r.l., to overcome the challenges facing the adoption of LEDs today, with cost being one of the main barriers. With such a promising future it is imperative that industry remains committed to improving and further understanding the advantage that LEDs can bring to the consumer, industrial and medical sectors alike.

Euan Morisson, Head of Lighting and Optics, Sagentia on LED technology on the LED market