

Welsh Ultra Efficient Lighting Centre: From CIRP to KTC

Swansea University's School of Engineering, have some of the brightest brains in Britain, and their work on finding a replacement for the incandescent bulb to reduce energy use is proving just that.

Lighting accounts for around 20% of electricity usage in the UK alone. It's also a major contributor to CO2 emissions; equivalent to 70% of that from the world's cars. The introduction of ultra-efficient lamp and control technologies could half the energy consumption used for lighting.

Currently most lighting found within homes, hospitals and offices is either incandescent, fluorescent or halogen. Incandescent lighting technology is now the best it can be. It produces light of high quality, but is not energy efficient. Compact fluorescent light bulbs (CFL) have good energy efficiencies but have a noticeable warm up period before they achieve maximum brightness, and there has been a recent concern about the UV emissions given from them, as well as over their waste disposal due to their mercury content.

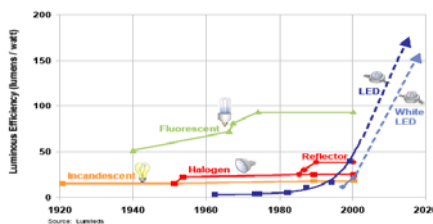
In response to these findings, a team of engineers at Swansea University began work on a Collaborative Industrial Research Project (CIRP) in January 2009, called Incandescent Replacement using Light Emitting Diodes (IRuLEDs), alongside LED lighting company Enfis

Group plc and RUMM (Remote Utility Monitoring & Management) Ltd.

The aim of the project was to develop an LED light bulb comparable to the 60W incandescent light source.

Watt a result

After trialling LEDs from several sources, the project team, in close collaboration with Enfis, discovered that the Enfis light engine was most appropriate for their trials. David Chan, from Swansea University's School of Engineering, explains further:



Igniting debate

The developments and expectations of various lighting technologies

“After some intensive research and development, we produced a prototype lamp that included an AC-DC power conversion, in a compact heatsink. We also added a dome coated with a phosphor, courtesy of an Enfis and Brunel University collaboration, to the LED light engine,

producing white light emission suitable for development into a final lamp.

“It really is an amazing breakthrough in lighting technology...when it is launched the LED bulb will help companies to considerably reduce their costs and their carbon footprint.”

Jamie Watkins

CEO at RUMM Ltd

“The breakthrough was fantastic, not only do LEDs have a significantly longer life time than alternative lamps, but the new prototype LED lamp emitted light that was equivalent to a 60 watt incandescent source, but only used 11 watts of electricity, and was the same size as a normal bulb.”

Jamie Watkins, CEO at RUMM Ltd, who contributed to the project, said:

“It really is an amazing breakthrough in lighting technology. We are always keen to find new methods of saving money for our customers, and when it is launched the

LED bulb will help companies to considerably reduce their costs and their

carbon footprint. RUMM is proud to be associated with the project and looks forward to working with the team on the next stages of development."

Dr Gareth Jones, CTO of Enfis Group plc was encouraged by the findings in the project. He said, "LED based lighting is leading a revolution in the reduction of energy consumption and a whole new world of lighting design freedom.

"The collaboration with Swansea University is creating an emerging centre of excellence in the research, development and testing of LED based light sources, which is leading the UK. This is key to energising our economy and shows how good working relationships between industry and academia can achieve great results."

Bright sparks

In March 2009, following this huge achievement, and other successful collaborative research projects, the team established the Welsh Ultra-Efficient Lighting Centre (WUELC) with the Welsh School of Architecture, Cardiff University and Enfis Group plc; the first centre of its kind in the UK. And in the following October, WUELC was approved for a Welsh Assembly Government Academic Expertise for Business (A4B) funding award to become a Knowledge Transfer Centre (KTC).

"The collaboration with Swansea University is creating an emerging centre of excellence in the research, development and testing of LED based light sources"

*Dr Gareth Jones
CTO at Enfis Group plc*

WUELC promotes the use of ultra-efficient light sources and lighting control technologies to minimize energy consumption in the private and public sectors, and reduce carbon emissions.

The aims of the centre are to:

- Conduct research in ultra-efficient lighting (UEL) technologies and applications, and to conduct other research in biological and medical related areas
- Develop best practice in light metrology
- Study the effects of light on humans
- Coordinate feasibility studies on implementing UEL technologies
- Provide a state-of-the-art independent research and development facility to assist the lighting industry through collaborative projects in research and development, to share any new knowledge with relevant bodies
- Inform the public sector, private sector and Government about the benefits of UEL, based on facts gained during controlled case studies
- Work in conjunction with other bodies to support the development of a quality mark and labelling, to indicate where lighting technologies meet or exceed acceptable performance criteria, and to develop the appropriate testing standards, policy, guidelines and regulation to minimise the impact of poor products entering the marketplace

Leading lights

David said, "Becoming a KTC, and receiving the funding to share our new technology with others was excellent for the project.

"It means we can support academic and industrial research and development, and has also meant that we can take our research to the next level as we've been able to buy a Near-Field Goniophotometer and Integrating Spheres."

"On 8th December 2008 it was announced that a report commissioned by the

European Union recommended a complete phase out of the incandescent light bulb by 2012. It reported that this measure would save approximately £8bn worth of energy per year, and reduce carbon emissions by approximately 13.2 million tonnes per year. To think that we could be influence and contribute to these savings is brilliant!"



Integrating Sphere

Some of the equipment that the Knowledge Transfer Centre was able to purchase

If the team's success is to be measured by anything, then it should be noted that they are working with several accrediting bodies for standards in the lighting industry, including the National Physical Laboratory, a world leading centre of excellence in developing and applying accurate measurement standards, as well as the Department for Environment, Food and Rural Affairs (DEFRA), the Department of Energy and Climate Change (DECC), the Department for Business, Innovation and Skills (BIS), and the Photonics and Plastic Electronics Knowledge Transfer Centre (PPEKTN), and are also one of only five centres registered with the Government for light measurements and testing and appears in the BIS ultra-efficient lighting (UEL) guide as the first UEL Centre of Excellence.

www.wuelc.net