

Low-energy LED lighting project is streets ahead

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Technology that first appeared in digital watches and calculators back in the 1970s is being used to develop durable and community-friendly low energy street lighting.

Researchers at The University of Manchester have joined forces with Dialight Lumidrives - founded by a successful former student - to develop powerful low-cost LED lighting modules that can be used in buildings and on roads.

Academics in The School of Electrical and Electronic Engineering will draw on their expertise to investigate how tightly packed groups of LEDs can be made to work safely and reliably.

Lighting solutions that use LEDs have the potential to reduce energy consumption by between 25 and 50 per cent, depending on the application.

But thermal and electrical issues at lighting levels of 12,000 lumens and above - a typical 60w household light bulb produces about 800 lumens - are barriers to the wider adoption of LED technology.

Engineers will be working with York-based Dialight Lumidrives to tackle tough issues such as the amount of heat generated by LEDs packed closely together.

As the LED modules will be used outside, academics will need to

consider environmental factors, such as the possibility of a bird nesting over a vital heatsink.

Another hurdle will be the regulations that govern things like glare and light pollution, and engineers say that directing LED light sources onto the required area will be a challenge.

The one-year project has been funded with a £175,000 grant from the Department of Trade and Industry-led Technology Programme. Dialight Lumidrives is contributing another £175,000 to the scheme.

A key aim of the project is to develop a solution that is very reliable but not prohibitively expensive.

Dr Roger Shuttleworth from the Power Conversion Group at The University of Manchester, said: "LED technology first came to prominence in instrument displays back in the 1970s, but we are increasingly seeing it used in things like traffic signals and car lights.

"Towards the end of the twentieth century, the old fashioned sodium street lights that made everything look orange were gradually replaced by high-pressure sodium lamps.

"While these are brighter and more aesthetically pleasing, and can help tackle street crime and anti-social behaviour, they are also less energy efficient.

"With the environment at the top of the public and political agenda, energy saving has become a very important issue. When you consider how many street lights there are in the UK alone, it's clear there are some big opportunities for energy and cost savings."

Gordon Routledge, MD of Dialight Lumidrives, who studied Electrical

and Electronic Engineering at the old UMIST and graduated in 1996, said: "LEDs are on track to become a major source of lighting over the next decade.

"Although significant investment is on-going in the core development of the LEDs themselves, the surrounding technology development is being left to manufacturers who have little knowledge of electronics or LEDs.

"We are proud to be working with The University of Manchester to develop technology which will drive the adoption of this revolutionary lighting source in everyday applications."

While high-pressure sodium vapour street lighting - common across much of Europe - gives an efficiency of around 85 lumens per watt, LED technology is on track to exceed 150 lumens per watt - and this figure is rising as new semiconductor developments occur. The mercury used in the old-fashioned lights also has implications for the environment.

As well as cutting energy consumption and overall running costs, researchers say that LED street lighting could help reduce light pollution - and the glow that radiates from big cities could become a thing of the past. It's also proposed that LED street lighting could be controlled and dimmed when necessary.

With a longer lifespan, LED street lights would need to be replaced less often, potentially cutting down on traffic disruption and local council repair bills.

The lifetime of the proposed LED module is in excess of 50,000 hours or 10-years if used for road lighting - approximately four times longer than a conventional street light.

Source: University of Manchester

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