

Low-cost LEDs to slash household electric bills

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This is the severn Bridge illuminated with white GaN LEDs.

A new way of making LEDs could see household lighting bills reduced by up to 75% within five years.

Gallium Nitride (GaN), a man-made semiconductor used to make LEDs (light emitting diodes), emits brilliant light but uses very little electricity. Until now high production costs have made GaN lighting too expensive for wide spread use in homes and offices.

However, with funding from the Engineering and Physical Sciences Research Council (EPSRC), the Cambridge University based Centre for Gallium Nitride has developed a new way of making GaN which could produce LEDs for a tenth of current prices.



GaN, grown in labs on expensive sapphire wafers since the 1990s, can now be grown on silicon wafers. This lower cost method could mean cheap mass produced LEDs become widely available for lighting homes and offices in the next five years.

Based on current results, GaN LED lights in every home and office could cut the proportion of UK electricity used for lights from 20% to 5%. That means we could close or not need to replace eight power stations.

A GaN LED can burn for 100,000 hours so, on average, it only needs replacing after 60 years. And, unlike currently available energy-saving bulbs GaN LEDs do not contain mercury so disposal is less damaging to the environment. GaN LEDs also have the advantage of turning on instantly and being dimmable.

Professor Colin Humphreys, lead scientist on the project said: "This could well be the holy grail in terms of providing our lighting needs for the future. We are very close to achieving highly efficient, low cost white LEDs that can take the place of both traditional and currently available low energy light bulbs. That won't just be good news for the environment. It will also benefit consumers by cutting their electricity bills."

GaN LEDs, used to illuminate landmarks like Buckingham Palace and the Severn Bridge, are also appearing in camera flashes, mobile phones, torches, bicycle lights and interior bus, train and plane lighting.

Parallel research is also being carried out into how GaN lights could mimic sunlight to help 3m people in the UK with Seasonal Affective Disorder (SAD).

Ultraviolet rays made from GaN lighting could also aid water



purification and disease control in developing countries, identify the spread of cancer tumours and help fight hospital 'super bugs'.

Source: Engineering and Physical Sciences Research Council

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