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The Future of Lighting / Emerging Technologies in Energy

2013-2015 IES PROGRESS REPORT

Submission Breakdown:			
Code	Type	No.	Percent
IS	Inc Sources	0	0.0%
FS	Fluorescent Sources	3	1.3%
MS	Metal Halide Sources	4	1.8%
SS	HPS Sources	1	0.4%
LS	LED Sources	50	22.2%
HB	HID Ballasts	0	0.0%
FB	Fluorescent Ballasts	4	1.8%
LD	LED Drivers	5	2.2%
EM	Emergency	1	0.4%
EL	Emergency LED	0	0.0%
CO	Controls	11	4.9%
AC	Accessory	6	2.7%
FL	Fluorescent Fixtures	0	0.0%
ML	Metal Halide Fixtures	0	0.0%
LL	LED Fixtures	118	52.4%
RE	Research	2	0.9%
PU	Publications	7	3.1%
MA	Materials	2	0.9%
DT	Design Tools	9	4.0%
		223	99.1%

Submission Breakdown:			
Code	Type	No.	Percent
IS	Inc Sources	0	0.0%
FS	Fluorescent Sources	3	1.1%
MS	Metal Halide Sources	0	0.0%
SS	HPS Sources	1	0.4%
LS	LED Sources	35	13.2%
HB	HID Ballasts	1	0.4%
FB	Fluorescent Ballasts	0	0.0%
LD	LED Drivers	9	3.4%
EM	Emergency	1	0.4%
EL	Emergency LED	0	0.0%
CO	Controls	16	6.0%
AC	Accessory	17	6.4%
FL	Fluorescent Fixtures	0	0.0%
ML	Metal Halide Fixtures	0	0.0%
LL	LED Fixtures	162	61.1%
RE	Research	2	0.8%
PU	Publication	8	3.0%
MA	Materials	5	1.9%
DT	Design Tools	4	1.5%
DL	Daylighting	1	0.4%
		265	100.0%

Submission Breakdown:			
Code	Type	No.	Percent
IS	Inc Sources	0	0.0%
FS	Fluorescent Sources	0	0.0%
MS	Metal Halide Sources	0	0.0%
SS	HPS Sources	0	0.0%
LS	LED	48	21.1%
HB	HID Ballasts	0	0.0%
FB	Fluorescent Ballasts	0	0.0%
LD	LED Drivers	6	2.6%
EM	Emergency	4	1.8%
EL	Emergency LED	0	0.0%
CO	Controls	20	8.8%
AC	Accessory	11	4.8%
FL	Fluorescent Fixtures	0	0.0%
ML	Metal Halide Fixtures	0	0.0%
LL	LED Fixtures	130	57.3%
RE	Research	0	0.0%
PU	Publications	5	2.2%
MA	Materials	1	0.4%
DT	Design Tools	2	0.9%
DL	Daylighting	0	0.0%
		227	100.0%

No Progress on Traditional Fixtures and Sources

DOE SSL Postings 7-23-15

“ADOPTION OF LIGHT-EMITTING DIODES IN COMMON LIGHTING APPLICATIONS”

- **While adoption growth rates have been very impressive in the last two years, SSL market shares remain modest.** From 2012 to 2014, LED installations increased in all applications, more than quadrupling to 215 million units overall. Market penetration climbed to 3% overall, versus less than 1% in 2012.
- **Outdoor LED applications enjoyed a 10% share of the 2014 market.** In contrast, LEDs earned only a 2.8% share across indoor applications. In terms of units, however, indoor lighting represents a significantly larger market than outdoor lighting.

Table 3.1 U.S. LED Market Share and Energy Savings Forecast Results by Sector

	2013	2015	2020	2025	2030
LED Market Share	3.2%	10%	48%	71%	83%
Residential	1.1%	4.3%	40%	80%	88%
Commercial	2.1%	7.9%	43%	67%	80%
Industrial	1.1%	3.6%	33%	71%	98%
Outdoor	8.1%	21%	75%	97%	99%

Above table from DOE/Navigant July 2014 Report



Winner of the Pulitzer Prize for National Reporting



The Lighting Paradox: Cheaper, Efficient LEDs Save Energy, and People Use More

The effort to replace current bulbs with LEDs gets a boost from cheaper materials, but it only feeds society's addiction to light.

By Phil McKenna

Aug 20, 2015



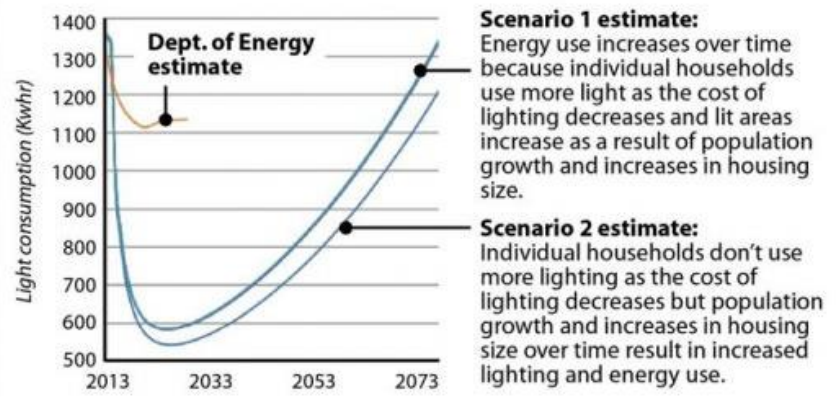
An LED lighting project in Portland, Ore. Credit: U.S. Department of Energy

LEDs Reduce Power Usage, For Now

High efficiency LED lights will reduce residential lighting energy requirements in the short term but an increasing amount of lit space and a tendency for individuals to use more light when the cost of lighting decreases will erode energy savings over time.

AVERAGE HOUSEHOLD ENERGY CONSUMPTION FOR LIGHT

in kilowatt hours, annual estimates (projected)



SOURCE: Emergent Effects of Residential Lighting Choices: Prospects For Energy Savings by Hicks, Zellner and Theis, Journal of Industrial Ecology, University of Illinois at Chicago

InsideClimate News

"I am doubtful that we will save any energy by going to LED lights," said Thomas Theis, director of the Institute for Environmental Science and Policy at the University of Illinois at Chicago.

<http://insideclimatenews.org/news/20082015/lighting-paradox-cheaper-efficient-led-save-energy-use-rises>

08/03/2015

Lighting Control Market Set to Double by 2024

LED, smart control adoption will help FMs meet energy goals

As FMs upgrade their outdated fluorescent lighting to more efficient LED options, both the amount and the variety of different controls and sensor products have increased and are projected to help the market grow from \$2.2 billion in 2015 to \$4.8 billion in 2024, according to new research.

The report from Navigant Research shows that the efficiency improvements required by building codes are a major driver. New options help FMs to upgrade basic lighting controls like installing occupancy sensors and photosensors, as well as create an opportunity for more comprehensive upgrades to control systems.

Also noted is the increased diversity among lighting control vendors, including "pure-play startup companies" offering creative strategies to manage the energy consumption of lighting. Traditional lighting vendors are also beginning to offer controls and building control companies are expanding their products' capabilities to allow them to work with the new generation of facility lighting controls.

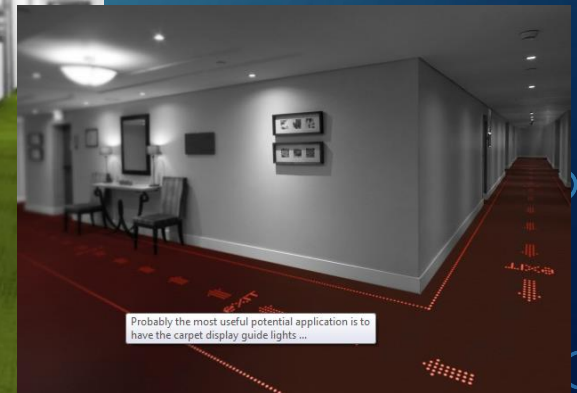


SSL INTEGRATION



Philips recently partnered with Desso, a high-quality carpeting producer, to create a new type of light transmissive carpet embedded with LEDs that can be programmed to display important messages, directions, or other information

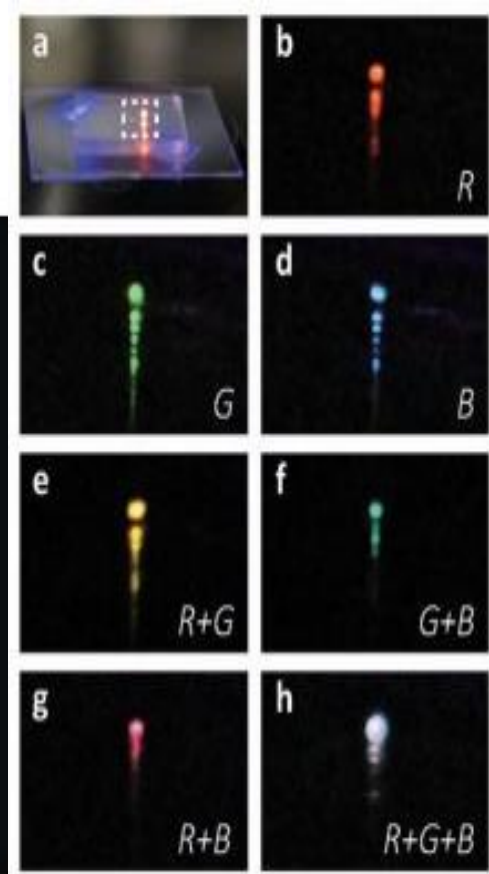
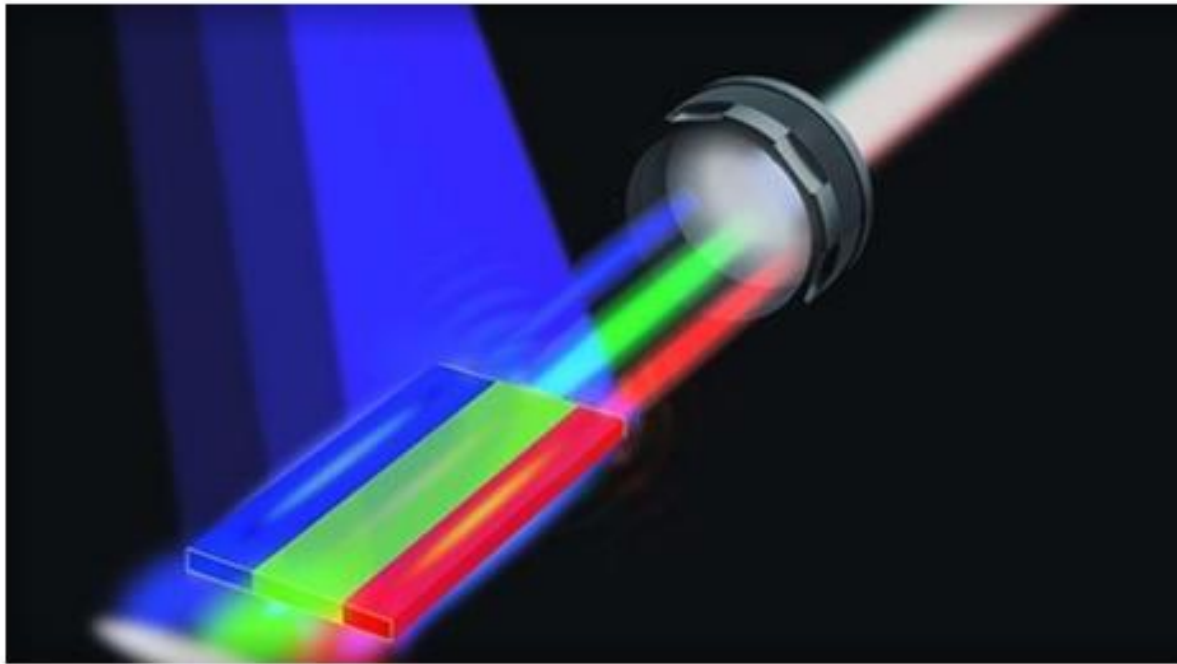
Normal people believe that if it ain't broke, don't fix it. Power electronics engineers believe that if it ain't broke, it doesn't have enough features yet.



Probably the most useful potential application is to have the carpet display guide lights ...

The world's first white laser could revolutionize lighting and display tech

By Ryan Whitwam on August 5, 2015 at 3:35 pm | 26 Comments



Incandescent bulbs have given way to CFL and LEDs, but these lighting technologies may be destined for extinction as well. A team of scientists at Arizona State University have developed a laser that can produce pure white light that is brighter and more efficient than even the best LEDs. Technically, the laser itself isn't white from the start, but the clever use of nanomaterials allows three colored beams to become one white beam.

<http://www.extremetech.com/extreme/211751-the-worlds-first-white-laser-could-revolutionize-lighting-and-display-tech>

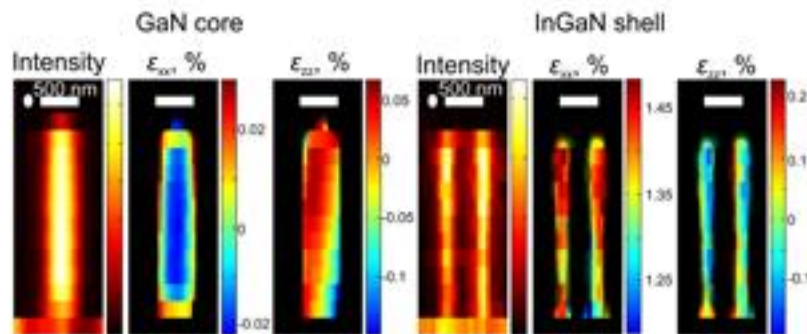


Niels Bohr Institute

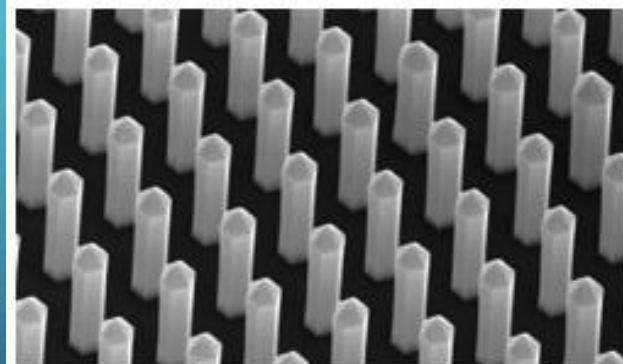
24 June 2015

Nanowires could be the LEDs of the future

NANO TECHNOLOGY The latest research from the Niels Bohr Institute shows that LEDs made from nanowires will use less energy and provide better light. The researchers studied nanowires using X-ray microscopy and with this method they can pinpoint exactly how the nanowire should be designed to give the best properties. The results are published in the scientific journal, *ACS Nano*.



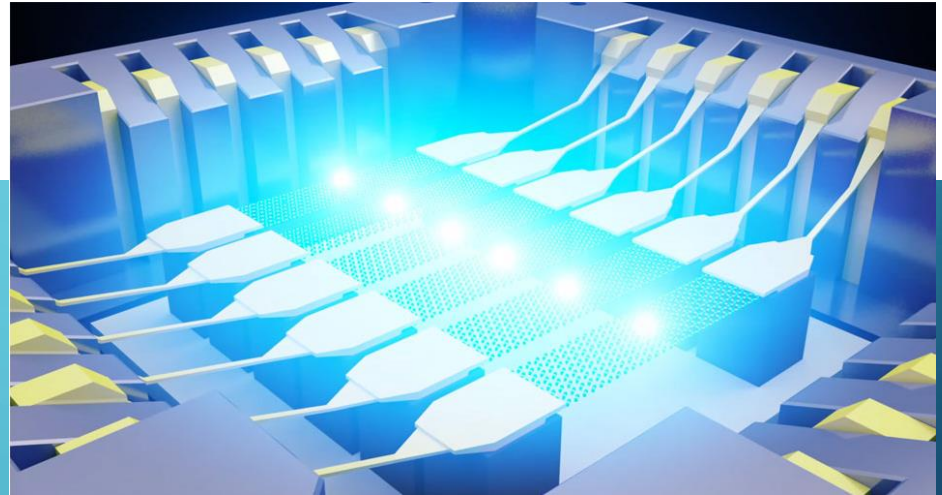
The X-ray images of each nanowire show the distribution of the scattering intensity and the mechanical strain in the core of gallium-nitride and the shell of indium-gallium-nitride. The strain shows that the shell fits perfectly with the core.



Seen here is a series of nanowires comprised of an inner core of gallium-nitride (GaN) and a shell of indium-gallium-nitride (InGaN). The nanowires are 2 micrometers high (1 micrometer is a thousandth of a millimetre) and 400 nanometers in diameter (1 nanometer is a thousandth of a micrometer).

The world's thinnest light bulb is made from graphene

 by Jon Fingas | @jonfingas | June 17th 2015 at 5:04 pm



[Image credit: Myung-Ho Bae/KRISS]

Forget LED light bulbs... in the future, your lighting may be made from [carbon](#). Columbia University researchers have built a [light bulb chip](#) that superheats graphene to produce illumination. While that's the same basic concept that you see in an incandescent bulb, the graphene filament measures just one atom thick -- this is the world's thinnest light bulb, and may be close to being the thinnest *possible*. It's transparent, too, which could suit it to [see-through displays](#).

<http://www.engadget.com/2015/06/17/graphene-light-bulb/>



Lamp that runs for 8 hours on water and salt

Manila, Jul 30, 2015, (PTI)



A new cost effective lamp that burns for eight hours at a time, running on nothing but a glass of water and two tablespoons of salt has been developed by a start-up in the Philippines.

The Sustainable Alternative Lighting or SALT lamp will also be able to generate enough energy to charge a smartphone through a USB cable, while also lighting up the room. The lamp works with a galvanic cell battery, which consists of an electrolyte solution - the salt and water - and two electrodes.

When the electrodes are placed in the electrolyte, the energy generated kicks an LED light into gear.

The battery will work for eight hours a day for six months, which is a considerable upgrade from the constant refills required by paraffin lantern, the developers said.

"Use the ocean-water to power up your lamp and it will give you eight hours of running-time," the SALT team said on its website.

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