

## The future's light

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*It might not have reached its full potential but LED design technology is developing fast.*

On a recent trek to Ikea, my six-year-old begged me for an LED nightlight in the shape of a ghost. He promised to forgo the hallway light at bedtime if only I would buy him this white, rubber phantom that glowed green when you tapped its head. After some negotiation, the Spöka lamp endeared its way into our gaping yellow shopping bag and initiated our family to a lighting revolution.

Until recently, light emitting diodes were mainly used for appliances and digital displays: red or green indicator lights and the square lit fonts on DVD players and other electronics. Advances in the technology have gathered pace in recent years, exploding the range of creative lighting solutions available for indoors and out. LEDs have become the muse of cutting edge lighting designers and an inspiration for environmentalists. They make feasible illumination effects that were once either impractical or impossible, while saving energy and reducing use of toxic components. In the past few years LED has bounded its way into non-residential applications - stores, restaurants, bars, hotels and landmark lighting - but experts say it is now poised to move into homes on a much larger scale. The manufacturer Osram, an arm of Siemens, predicts the technology will take over at least a third of the entire lighting market by 2020.

"LED is the future," says Walter Gadda, the head of Aldabra, an Italian specialist in fixtures using the technology. "It has incredible advantages."

Because LED units are small (ranging in size from barely visible to the dimension of a large raindrop), relatively cool, and extremely durable (lasting 30 to 50 times as long as an incandescent bulb), they can be tucked into unconventional places. Gadda places them like mortar between bathroom tiles, inserts them into stone panels, deploys them in a streak across wood parquet or lays small bricks of them between fingers of white travertine limestone. He makes starry ceilings or twinkling floors, backlit onyx

panels and bottom-lit vases. He has just launched a line of fixtures for yachts because, unlike incandescent lights, they won't blow with the vibration of a motor or the rocking of a wave. Another Italian firm, Luce & Light, uses them to illuminate wet places, backlighting mosaic bathroom tiles or lighting up showers, and inserts them in places where they will be walked over. LEDs are catching on in cars, replacing tail lights, dashboard and interior lights in upper-mid-range models. A luxury SUV, the 2008 Cadillac Escalade, uses the new technology from the nose to tail, including the headlights. Its owners might never have to change a headlight because LEDs last 30,000 to 50,000 hours or as long as 10 years.

LED lights have become popular for marking stairways or walkways, for hallway sconces and to brighten bookcases or other nooks. Swarovski inserts them behind cut crystal fittings that throw intricate geometrical patterns of light and shadow on ceilings and walls. Fixtures on Swarovski's website for contemporary lighting show stars, sunbursts, halos and snowflake-like patterns.

LEDs also lend themselves to be used like a painter's palette, because they come in a variety of neon-like hues. Since they can be dimmed, unlike fluorescent bulbs, many new fixtures change colour and intensity at the turn of a knob or the push of a button. Blue, red and green lights can be mixed to produce almost any hue, including white. Philips' Color Kinetics in Massachusetts has developed a range of fixtures that deploy coloured light as ornament, accent, festive outdoor lighting and indoor atmospherics.

Much hubbub about LEDs also comes from their promise of high energy efficiency and relatively non-toxic components. Developers have managed to increase their brightness by a factor of 10 in the past decade and are still cranking. Top-end versions give off as much light per watt as fluorescent lamps. Unlike fluorescents, though, LEDs do not contain mercury or a significant quantity of other toxic materials.

Not surprisingly, the hip and well-heeled are increasingly asking their architects to incorporate them in their homes but experts say that does not necessarily mean you should - yet.

"LEDs are still coming along," says Kathy Abernathy, the energy and sustainability chair for the International Association of Lighting Designers. "They are not yet there but I think they will be."

She reports they are still expensive for the quality and quantity of light they give off. Abernathy installed a pair of high-end, white, recessed down lights in her office as an experiment. They use 13W, take over from 60W to 75W lamps, and cost about \$100 (€70) each. Colours aren't quite true under their bluish white light and, when the crystals stop working, she'll have to replace the whole fixture because replacement crystals are not available. Nevertheless, she likes them. "It has a crisp look, like halogen."

LEDs also have yet to be standardised. Fixtures have widely varying power supply and installation requirements, which Los Angeles lighting designer Sean O'Connor says scares off home contractors unfamiliar with how to treat them.

"We're doing a house now where the primary light source is LED," says O'Connor, who runs his own firm, Sean O'Connor and Associates. "It's not easy. In the end we'll be about 90 per cent LED. A big challenge is to create consistency in the lighting."

O'Connor says they are tricky to work with for a number of reasons: they are so small and focused, like miniature spotlights; intensity falls off over distance far faster than with other lights; achieving brightness requires using a large number of them in arrays, which can lead to multiple shadows and other collateral effects; the edges of things can change colour, acquire a slight pink or blue shadow, for example, or multiple shadows of changing intensity. O'Connor says they work best as decorative or indirect lights and advises against them for task lighting, such as tucking them under kitchen cabinets to light countertops. "They can create a kind of strobe effect and obscure visibility. You could even chop your finger."

Jürgen Waldorf, managing director of the German electrical and electronics industry group ZVEI, says a better bet for bright, warm, direct light can be found in a new generation of energy efficient halogen bulbs. Sold as E halogen, GLS or IRC, the new halogen bulbs reduce energy consumption by about 40 per cent.

"LEDs are not a panacea - not yet, but they are getting there," says Paul Nulty, lighting designer and director of the UK Light Bureau in London. "We're just starting to see useful products come on to the market."

Nulty says new lighting technologies, like LED, compact fluorescents and new generation halogens are now changing altogether the nature of domestic lighting. "It is all about creating textures and layers of light now, whereas lighting used to be a 60W pendant in the middle of the room."

In the future this complex picture is expected to become yet more sophisticated as another lighting variety might weave its way into our homes: the OLED. The "O" stands for "organic". It is a light emitting layer of organic compounds that can be spread across a surface. OLEDs are already used as video screens in some high-end cell phones. Future uses might include wall panels, blinds or fabrics. People who currently endure sun deprived polar winters might one day bask in OLED light from their windows. Animated or illuminated wallpaper could possibly enter the mainstream.

When I told my six-year-old about these futuristic possibilities he was duly impressed. When we tried out his new green phantom from Ikea, however, it did not generate enough light to ward off the ghosts of his imagination. The halogens in the hall remained lit, while the spent white ghost shared a small bed with my son's favourite stuffed animal, a knit wool octopus.

Fonte: Financial Times, London, May 31 e June 1 2008. Design, p. 12.

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