"LET THERE BE LIGHT"

AN ILLUMINATING HISTORY

The speed of light is nothing compared to the speed at which lighting trends are evolving, as new technologies drop costs and energy consumption, and open new horizons in design.

By: Candace King and Tammy Sutherns

The Alice Towers in Sandton. Increasingly, lighting is being used to beautify and add impact to building exteriors and outdoor spaces.

TOP AND BELOW: Moses Mabhida Stadium incorporates the latest in hi-tech and sustainable lighting. The arch overhead is made up of 1.8m LED strip lights, which are 70% more efficient than fluorescent alternatives.

The history of light and light sources has come a long way: from cavemen experimenting with fire and ancient civilisations using natural light sources, to gas lighting and the electric lamp.

One of the greatest human discoveries was the use of fire as a source of heat and light, an estimated 400 000 to 1.9 million years ago. Around 70 000BC early man began using naturally occurring primitive oil lamps such as coconuts, sea shells, egg shells and hollow stone, as well as burning materials soaked in animal fat.

By the 7th Century BC the Greeks had replaced hand-held torches with terracotta lamps, and up until the late 18th Century oil lamps, torches and candles were commonly used, fuelled with olive oil, beeswax, fish oil, sesame oil, nut oil and others. Oil lamps were even adopted for public illumination in towns and cities across the globe, for an extra measure of security and guidance at night. In 1128 in Venice, under the Doge Domenico Michiel, a few small lamps were placed on the walls of the houses to burn all night and "give courage" to wayfarers.

To this day, many cultures and religions around the world including Judaism, Christianity, Hinduism, and Chinese folk religion still use oil lamps for religious and symbolic purposes, as well as spiritual rituals and ceremonies.

As early as the 4th Century BC the Chinese had invented a system of bamboo tubes that allowed them to use natural gas for fuel and light. But it wasn't until the late 1700s that gas found a footing in the West. This was when Scottish engineer and inventor William Murdoch developed a way to exploit gas's flammability for lighting. Murdoch first lit his house with gas in Redruth, Cornwall in 1792, followed by the main building of the Soho Foundry steam engine works in 1798. Throughout the 1800s and into the 1900s gas lighting became commonplace, and it was the German inventor Frederick Albert Winsor (originally Friedrich Albrecht Winzer) who patented it and installed gas lights on London's Pall Mall in 1807.

In 1846, Canadian physician, surgeon, geologist, and inventor Abraham Gesner developed a process of refining a liquid fuel from coal, which he named kerosene. The distillation process was a cheaper alternative to whale oil, and the demand for kerosene grew rapidly. During the 1850s, Polish pharmacist Ignacy Łukasiewicz was also involved in the research of crude oil distillation and it's debated whether Gesner

Aesthetics are a major concern in modern lighting. A favourite design at Phase Africa is the Burst Pendant Light, which can opened wide or folded down.

ABOVE LEFT AND BELOW: The architecture of the Nelson Mandela Bridge is showcased with a 5 725m² capacity for lighting, including colour

or Łukasiewicz should be called the true father of kerosene.

Most cities in the US and Europe boasted gaslit streets during the 19th Century, and this is also the time that the sodium vapour lamp arrived on the scene. But it was the discovery of electric light that took the world by storm.

Though the history books credit Sir Thomas Alva Edison with inventing the light bulb, Edison actually built on the contributions of other developers, making improvements to the idea of incandescent light. The history of electric lighting began in the late 1800s with the incandescent lamp and the carbon arc lamp, and the neon lamp and fluorescent lamp during the 1900s. From the 1950s onward we see the electrodeless lamp, the electroluminescent (EL) lamps and displays, light emitting diodes (LEDs) and organic light-emitting diodes (OLEDs).

FASHION FORWARD

Today, lighting has evolved drastically. In the past, sources of light were essentially used for warmth, heat, cooking, illumination, guidance and security. Today, lighting has become a fashionable trend, with lighting applications used to beautify areas, buildings, exteriors and interiors, office blocks, recreational venues, signage and retail locations and facilities.

Just as Gesner's kerosene essentially helped saved the whale, lighting applications today are becoming more eco-friendly and sustainable, with such technologies as solar lighting and energy-saving light bulbs.

As lighting in commercial space has evolved, so businesses have become more willing to feature beautiful designs and innovative creations. Noleen Kutash from Phases Africa says modern design is a huge trend at the moment. One of her favourite creations is the Burst Pendant Light, manufactured by a South African artist in Cape Town. She says, "I think this is stunning. I'm proud of this artist for having created such an innovative design."

This hanging pendant light can be seen in three different settings. It's made from Panda-friendly bamboo ply and is handmade so that each part of the light shade is unique. The design is intended to evoke a sunburst, but it can be flat-packed for transit. The finish on the Burst Pendant Light is a blend of beeswax and plant oil, with a clear finish.

Cultural spaces and heritage sites have also begun to use lighting to showcase their structures, illuminating them with different colours and innovative lighting. Take the

The latest options in hi-tech corporate lighting include low-energy LED options and wireless control.

Nelson Mandela Bridge in Johannesburg City: opened in 2003, the bridge cost R38 million to build and is the largest cable-stayed bridge in southern Africa. It also incorporates architecturally themed lighting to make it even more impressive. The space has a 5 725m² capacity for lighting, which now includes colour lighting and spot lights that show off this iconic architectural piece.

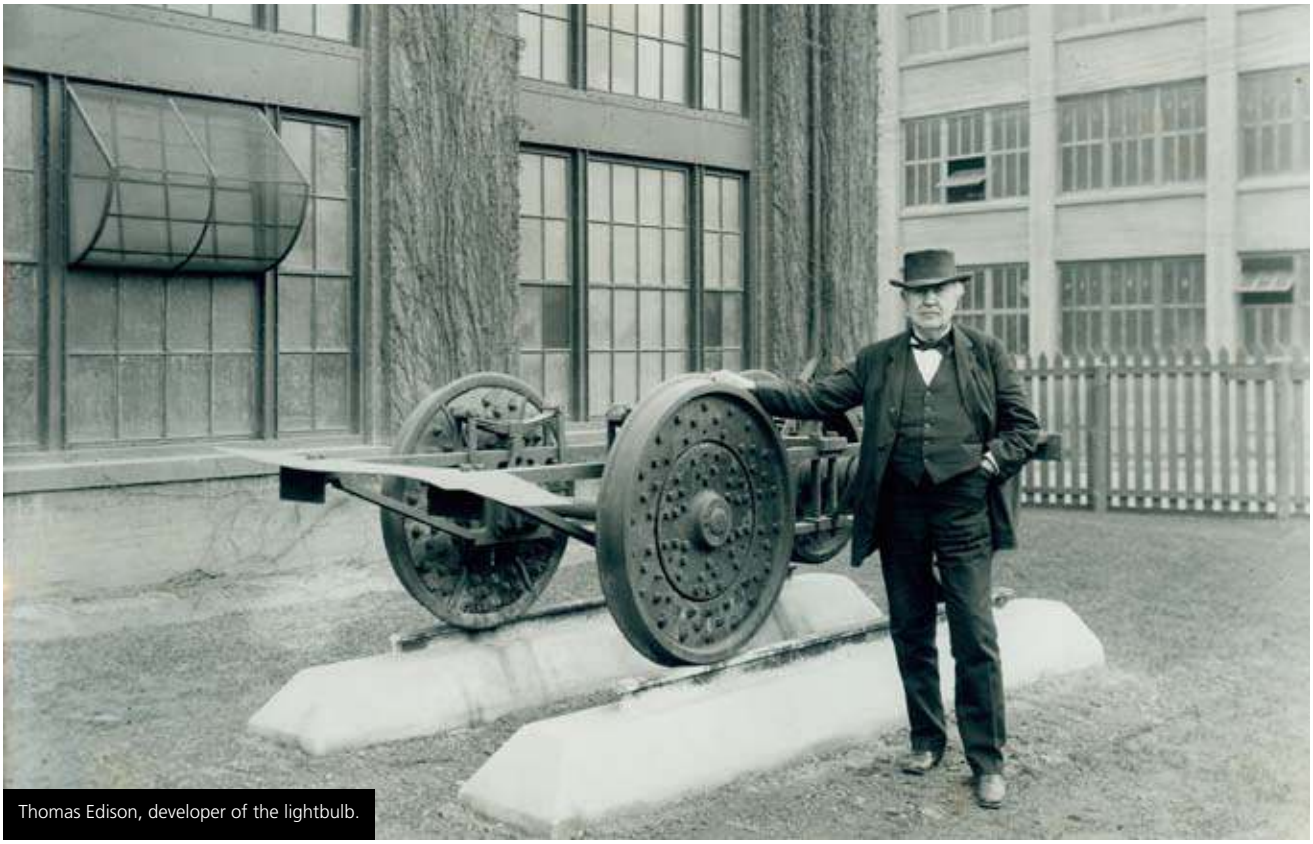
SUSTAINABLE SOLUTIONS

Commercial properties, faced with new building regulations, electricity rate hikes and the growing green revolution, have also started looking for alternative lighting solutions. One of the big movements has been a trend towards LED technology, which offers a low-energy light source.

Candela LED, based in Cape Town, offers practical solutions for companies in the lighting industry. The company's owner/director Jeremy Feigelson says, "The first reason property owners and businesses are converting comes down to simple economics. Despite the initial outlay needed to covert to LEDs, they can save you up to 90% on your current lighting costs."

Feigelson says one of their best sellers are the Cree GU10 halogen replacements. "The LEDs pay for themselves in six to 18 months in electricity savings alone. The timing of the payback depends on how many hours per day the lights are in use. And with Eskom's 25.9% price hike coming in April, the payback time will be even less."

As the LEDs last up to 50 000 hours, 50 times the lifespan of an incandescent bulb, Feigelson says the buyer saves on replacements and labour too. Environmental bases are also covered. "LEDs use half the power of fluorescents and compact fluorescent lamps (CFLs) and contain no harmful chemicals or metals. In contrast, fluorescents and CFLs contain mercury



Thomas Edison, developer of the lightbulb.

and, if not properly disposed of, can contaminate landfills and water supplies. They're also very fragile."

The switch to LED has also been about the quality of light, Feigelson says. "Compared to fluorescents and CFLs, LEDs emit a very natural, warm light. They're versatile and the amount of warmth or coolness you require can easily be tailored for your office or home."

There's growing innovation in all aspects of alternative lighting solutions. Matthew Kain from Qwik-Switch says the company has been been implementing wireless lighting control as a huge cost saver, which is also far a more convenient form of control.

He explains, "We offer a comprehensive solution, allowing access and control from wireless switches as well as web and mobile phones. Wireless control offers many advantages, such as scheduling office lighting for energy saving, scene controls for boardroom presentations and the convenience of off-site remote lighting control." The Qwik-Switch product is also developed and manufactured in South Africa.

SCORING POINTS

Larger structures, like the Moses Mabhida stadium built for the 2010 Fifa World Cup, not only take advantage of the aesthetics of lighting but remain sustainable too. The stadium uses several types of lighting: most prominently, 548 flood lights provide field lighting, using special reflectors and diffusers to reduce maximum demand and energy consumption.

Concourse lighting is also used, consisting of metal halide fittings with a 70W to 150W output and fluorescents ranging from 18W to 55W. The fluorescents have an electronic control gear which is 8% more efficient than standard fluorescent fittings. Meanwhile, bowl lights consist of 1 100 T5 fluorescent fittings, which are 10% more efficient than standard T8 linear fluorescents.

The offices are lit by T5 fittings with an electronic control gear and an efficient reflector system. The control system makes it easy to manage which lights activate when.

The arch is made up of 1.8m LED strip lights, which are 70% more efficient than the fluorescents. Incoporated into the original design, they're controlled by a computerised system which allows for various modes and settings at any given time, and also operates the lighting of the People's Park.

Lighting is no longer just functional, but has become something of an aesthetic phenomenon. Different technologies allow for sustainable solutions for lighting, but innovation and creativity allow for experimentation and enhancement of what South Africa has to offer.

LIGHTING MILESTONES FROM THE 20TH CENTURY AND BEYOND

- The Roaring Twenties: The first frosted light bulbs and adjustable power beam bulbs for car headlamps emerge.
- The Dirty Thirties: The invention of little one-time flashbulbs for photography and the fluorescent tanning lamp.
- The Warring Forties: The first soft-light incandescent bulbs.
- The Nifty Fifties: The emergence of quartz glass and later, the halogen light bulb.
- The Swinging Sixties: Better ellipsoid reflectors and mirrors for even brighter bulbs.
- The Disco Seventies: Engineer Edward E Hammer developed the first compact fluorescent bulb, a spiral-shaped bulb that would fit in the average lamp.
- The Greedy Eighties: New low-wattage metal halides emerge.
- The Naughty Nineties: Dutch electrical company Philips invents the amazing 60 000+ hour magnetic induction light bulb. New environmentally friendly bulbs like the full spectrum light bulb gain popularity.
- The Noughties: Philips unveils the extraordinary Light Blossom, an LED street lamp with solar panels and "petals" that open to act as wind turbines and generate electricity.