

INDIA'S FOREMOST MAGAZINE ON THE LIGHTING INDUSTRY

Lighting India

₹ 125

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May-June 2017



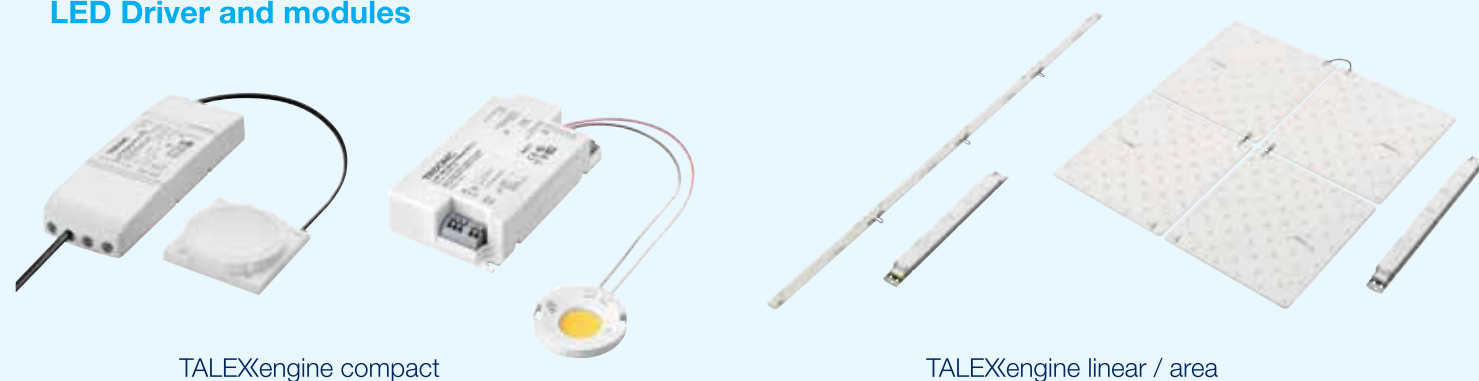
Lighting of Iconic Structures



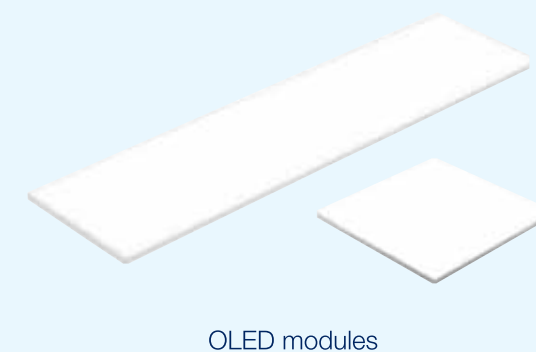
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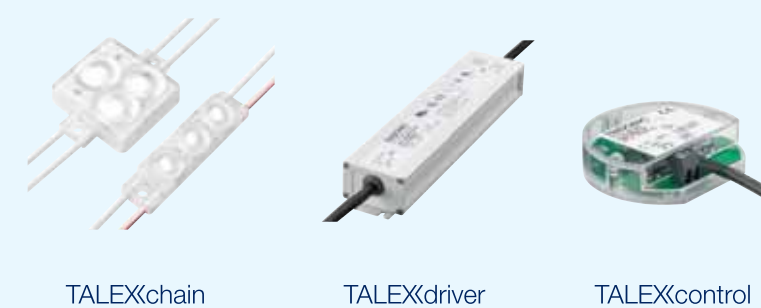
Electronic components



Controls



Signage





LED *all the Way*

Hello and welcome to *Lighting India*, the oldest magazine and one of the most widely read magazine on the lighting industry in the world. Ever since the Narendra Modi government came to power, there has been a concerted effort to improve energy efficiency in the country. This is quite visible from the fact that the government is expanding the use of LED lamps throughout the country. Apart from the LED lamps the government is keen on increasing the use of more energy-efficient air conditioners and fans.

As I am penning this, the government has distributed 24,50,06,544 LED lamps throughout the country. This translates to saving almost Rs 12,727 crore, avoided a peak power demand of about 6,370 MW and saved nearly 31,820 mn kWh of power. By doing this we have reduced nearly 2.5 tonnes of CO₂ per year.

One should give credit to the Bureau of Energy Efficiency or the BEE for laying the foundation for this way back in early 2010 under the UPA -II era. It's not that everything started with this government coming to power. Almost 10-12 standards were announced and laid down by the Bureau of Indian Standards with regards to LED lamps in 2012. Today, bulk of LED lamps are procured by the government for distribution from the Energy Efficiency Services Limited, a joint venture of NTPC, PFC, REC and PGCIL, which was established, again under the UPA regime.

The target of the government is to replace each and every old fluorescent lamp to LED lamp in the next three years. The government is today selling these LED lamps to the consumers for anywhere between Rs 70 and Rs 100. The government has been able to sell at this rate because it is successful in procuring these 9W lamps at around Rs 55 from different manufacturers, including EESL. It's a substantial drop in procurement price from the 2014 level of around Rs 300. Will the government be able to keep the prices down once they exit the scheme of distribution of LED lamps? Because considering the power fluctuation in rural areas of the country, it's quite possible that these lamps (they are also procured from China), may fail. Mind you, it's easy to say they have warranty of two years but more difficult to go to remote places to get a replacement. Hopefully the government would be able to supply these lamps at around this price for few more years.

Do send in your comments to me at miyer@charypublications.in

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GPRS/GPS Cloud Connectivity | Individual Light Dimming | Multi Parameter Metering | Cloud Based Software

THE MOTWANE MFG. CO. PVT. LTD.

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The palace is lit up for one hour (7 pm to 8 pm) during Sundays and Public holidays with Police Band Performance. On the other days there is colourful Sound & Light show between 7 pm to 7.45 pm. During these 15 minutes, the palace is illuminated with almost one lakh bulbs...



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department

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Focus: Welcome/Introduction

Session 2: I'm a Guide

Focus: Influence, Respect, Process

Session 3: I'm a Partner

Focus: Solid Ground, Buy-In, Connection

DAY 2

Session 4: I'm a Results Champion

Focus: Momentum, Priorities, Law of the Lid

Session 5: I'm a Leader Maker

Focus: Equipping, Replication, Inner Circle

Session 6: Wrap Up

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Acuity Brands introduces Atrius Brand for its IoT business solutions

Acuity Brands unveiled its new Atrius brand, encompassing the company's portfolio of Internet of Things (IoT) business solutions and Atrius software platform. Through Atrius, Acuity Brands will continue to provide and expand its comprehensive set of IoT business solutions, leveraging intelligent luminaires, lighting and building management controls, software platform services and solution development tools.

Atrius solutions deliver connectivity and intelligence to a space via an expansive network of smart LED lighting and controls and a software platform that gathers, unlocks and transforms raw data to enable a broad range of software solutions addressing critical business challenges. Atrius solutions have been already deployed across more than 50 million square feet of indoor spaces, leveraging more than a million sensors. Additionally, an installed base of Acuity Brands networked lighting systems, encompassing more than one billion square feet, can now be upgraded to a more multifunctional Atrius sensory network that can supply IoT data to the Atrius platform.

The Atrius software platform is a robust, scalable and secure platform that enables an array of capabilities, including indoor positioning, asset tracking, space utilisation, spatial analytics and energy management. The Atrius Solution Builder provides a comprehensive development environment for customers and partners to build IoT solutions leveraging the Atrius platform. And the Atrius partner program enables lighting manufacturers to add their luminaires to the Atrius sensory network, and software companies to leverage the power of smart lighting to deliver impactful business solutions to their customers. ■

Bajaj encouraged LED through Justin Bieber's Purpose World Tour in India

Bajaj Electricals Limited, India's well known player in consumer durables, fans, lighting and Engineering Projects, partnered with Justin Bieber's Purpose World Tour in India as its exclusive lighting partner. The company aimed to spread eco-friendly message by encouraging



Energy Efficient LED tree

the young audience to switch to LED through the Canadian megastar's music concert at Mumbai's D.Y. Patil Stadium on 10th May, 2017.

Festival goers witnessed some amazing and breathtaking installations done by Bajaj Electricals, specially designed for the concert. They had a tailor-made and energy efficient LED trees at the venue and lit up the tunnels to the concert with LED bulbs.



Lit up tunnel

Anant Bajaj, Joint Managing Director, Bajaj Electrical, said, "I am thrilled to be associated with Justin Bieber's Purpose World Tour in India. Aligning with the right artists will help us reinforce our brand ethos and provide a platform to drive the message of eco-friendliness through the 'Switch to LED' campaign among this country's youth population." ■

Cree offers easy choice for contractors and distributors

Cree unveils C-Lite LED Lighting by Cree (C-Lite), a portfolio of LED lighting products that offers electrical distributors and contractors a broad range of stock and flow items with the energy efficiency and performance they expect. The new portfolio complements market-leading Cree and Essentia by Cree branded lighting products, making available high performance Cree-backed products across market segments.

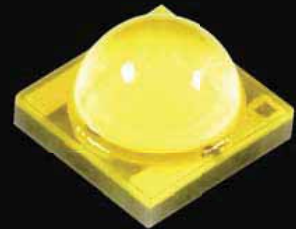
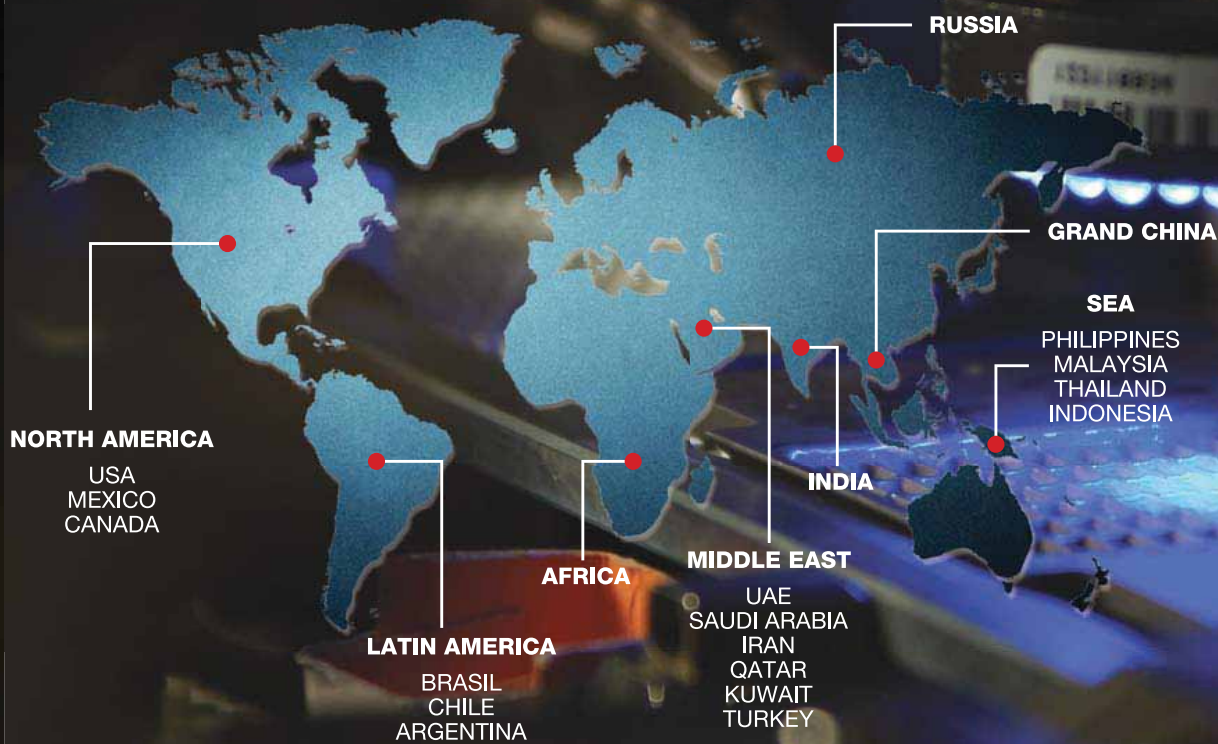
The C-Lite portfolio provides customers with a complete line of commercial lighting products from Cree and satisfies customer demands for a broad range of reliable, readily-available and easy to install contractor grade products. The comprehensive portfolio will launch with indoor and outdoor offerings including area lights, flood lights, canopy, high- and low-bays, vapour tights, wall mounts, and wall packs.



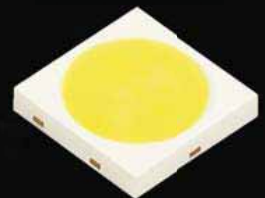
The new portfolio is designed with simplicity in mind to make jobs of all sizes quick and easy. C-Lite fixtures offer high-efficiency performance and are backed by a competitive 5-year warranty and Cree's world class service and support. ■



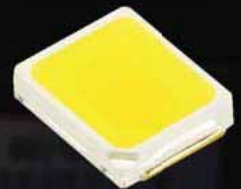
MLS INDIA is a subsidiary of **MLS Co. Ltd.** which was founded in 1997 and is one of the largest manufacturers & suppliers of **SMD & DIP LEDs**. **MLS** was one of the earliest LED manufacturers and light-source provider for various kinds of lighting products. Headquartered in Zhongshan City of China, with a workforce of more than 12000 employees, **MLS** has fully-integrated, world class facilities supported by the most advanced technologies. A wide choice of LM80 certified **MLS LEDs** are available in Warm white, Natural White and Cool White CCTs. Lamp manufacturers using **MLS LEDs** can bid for all BEE, EESL, Municipal Corporation and Government Tenders & BIS based LED projects with our 2835, 3030 and 3535 LEDs. **MLS** also has a wide range of Color LEDs available in 3014, 2835 and 5050 packages.



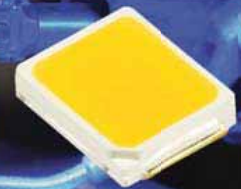
M3535



M3030



E2835 (CW)



E2835 (WW)



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Lunera's new CFL LED Replacement Lamp is first to achieve DLC v4 listing

LuneraLighting Inc., a well known LED lighting and Energy Management Optimisation, has introduced the industry's first 4-pin 26W compact fluorescent replacement lamp - to meet the recently enacted



DesignLights Consortium (DLC) specification and qualify for DLC listing. The new specification was anticipated by utility companies to establish rebate programs that further encourage LED retrofits by greatly reducing upfront costs.

The Lunera CFL LED G24q is the company's latest ballast-driven LED lamp. It is the fourth generation in a family of lamps that introduced plug-and-play CFL replacement lamps to commercial and industrial markets in 2013.

To achieve DLC v4.1 Listing and attract utility company rebates, Lunera made design improvements to dramatically improve efficacy (lumens out per watt consumed). Lumen output is nearly 50% greater than the previous generation, while power consumption has dropped over 20%. In addition, Lunera, an established industry leader in ballast compatibility testing, has expanded the number of industry-standard ballasts compatible with the new lamp. ■

dbn Lighting and Audile become dbnAudile

Manchester based lighting and rigging specialist dbn has joined forces with full service event technical company Audile, to create an exciting new venture – dbnAudile.

The merged company combined a wealth of experience, skills and talents across the disciplines of lighting, audio, rigging and creative video all under one roof in central Manchester.

The increased scope and range of equipment, expertise and strong synergies present in dbnAudile will allow the company to further develop and grow its business going forward.

There are no planned changes in personnel. The existing Audile team and all their assets will transfer to dbn's Downing Street premises in central Manchester and the newly merged company's board of directors will comprise Nick Walton, Pete Robinson and Stephen Page of dbn lighting along with Rob Leach and Rob Ashworth from Audile. All will continue to be hands-on and active at the sharp end of the enterprise.

dbnAudile's MO will continue the core values at the heart of Audile and dbn – a dedication to delivering brilliant technical production with creativity, imagination and value to clients. Business will continue to be conducted with openness and integrity, maintaining the infrastructure and vibe of friendly collaboration and community that all involved have striven so hard to establish. dbnAudile was officially launched on April 1st 2017 with all 38 full time staff. ■



EESL takes UJALA to UK

Taking forward the collaboration of UK and India in the energy & power sector, Piyush Goyal, Hon'ble Minister of Power, launched the affordable LED lighting scheme – UJALA scheme – in the United Kingdom. Energy Efficiency Services Limited (EESL), under the administration of Ministry of Power will implement the scheme in the UK. Additionally, the Hon'ble Minister, Piyush Goyal also revealed that EESL will invest Rs. 800 crore in the UK over a period of three years. The investment will drive various energy efficiency initiatives in the UK. This investment furthers the cause of enhanced 'Energy for Growth' partnership, envisaged by the Prime Ministers of both countries Narendra Modi and Theresa May.



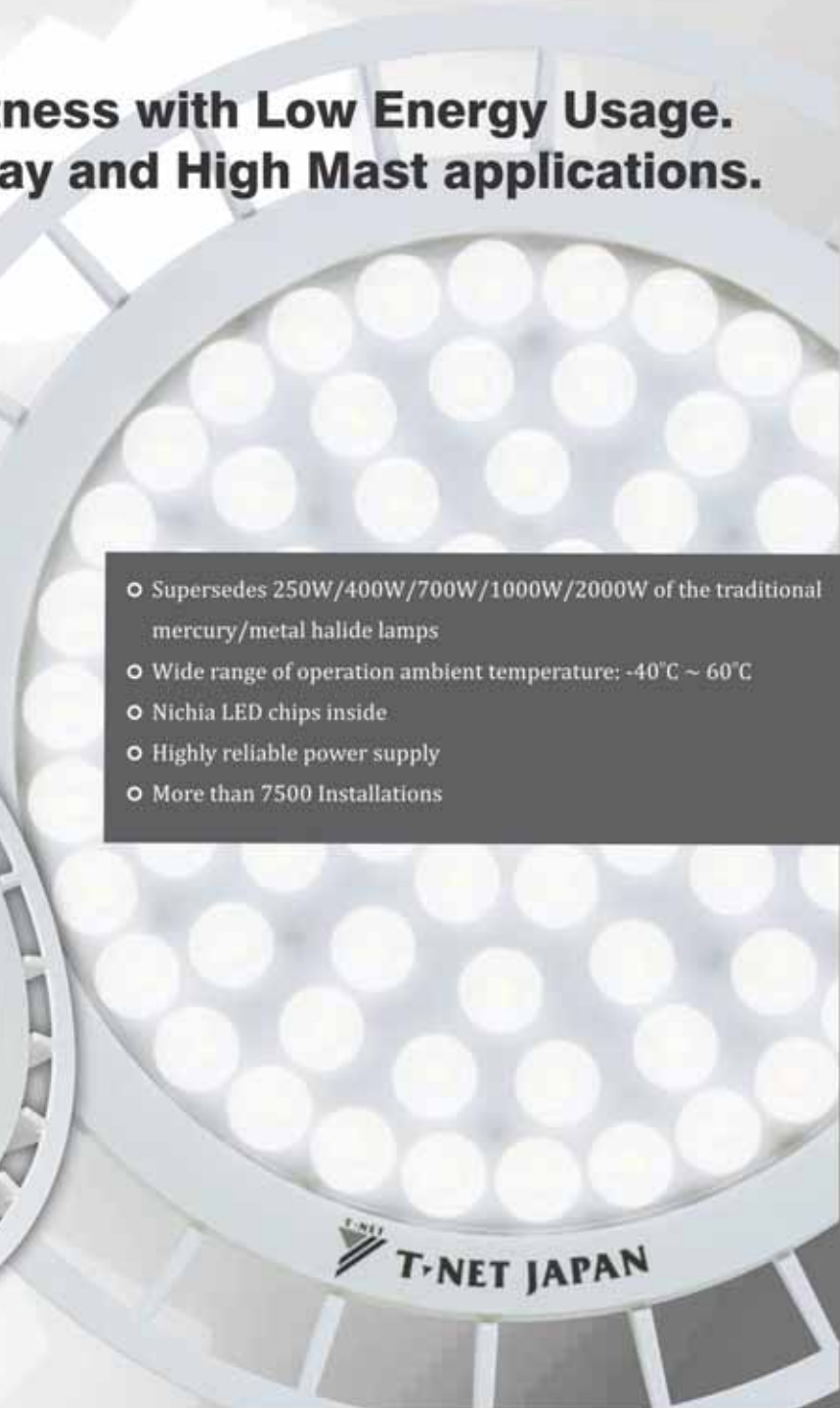
Piyush Goyal

In the UK, EESL aims to promote and implement low-carbon, energy efficiency and renewable energy solutions in both public and private sectors. EESL is presently implementing seven energy savings contracts in the UK in the education and leisure sectors. Piyush Goyal said, "The greatest threat to our planet is the belief that someone else will save it. An inconsequential LED bulb has brought tremendous impact for India, where lighting accounts for nearly 180 billion units of energy annually. EESL has demonstrated immense success through UJALA. The initiative has allowed each one of us to contribute to saving energy. I am confident that UJALA LED bulbs will brighten the United Kingdom, reducing electricity bills and emissions. I would urge each one of you to become the ambassadors of this revolution in energy efficiency." ■

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Osram participates in greenhouse developer agrilution

Osram participates in the Munich-based company agrilution. Through its Venture Capital unit Fluxunit, the lighting group now holds a strategic minority stake in the start-up, which offers an intelligent greenhouse for home use. Even without any gardening expertise, herbs, salads and vegetables can be planted in their own four walls. Thanks to special LED technology, the harvest yield can be significantly increased.



Ulrich Eisele, Managing Director of Osram's Fluxunit, said, "Thanks to its innovative business model, agrilution fits perfectly to Osram. At the same time, Osram can contribute to the further development of agrilution with its light and Horticulture expertise."

Osram has especially developed lighting solutions for the cultivation of plants in greenhouses or indoor spaces, which can stimulate and control plant growth. The greenhouse designed by the start-up also includes special LED technology from Osram. The Smart Home application recognises the seeds and ensures optimal growth conditions by automatically regulating irrigation, temperature and lighting. This allows the cultivation of a variety of herbs, salads and vegetables regardless of weather and climate. ■

Hubbell Lighting checks into the Patient Room

Hubbell Lighting, a well known leader in lighting innovation, revealed that it will go to market with two new products that will redefine the value proposition of traditional fixtures in the patient room at healthcare facilities.

While many of the current solutions were converted to solid-state from fluorescent, Hubbell has taken a different path. Healthcare Solutions has designed around the characteristics of solid-state solutions – eliminating the need to compromise on luminaire performance or aesthetics. The introduction of Evexia and MediMode demonstrate how this approach delivers a winning combination of features that meets or exceeds the needs of all healthcare stakeholders.



The addition of these specific patient room products will immediately enhance Hubbell's overall value proposition for the healthcare facility. Its portfolio of LED lighting solutions helps improve operations, reduces maintenance, performs as advertised and saves money. From recessed downlights in the lobby, emergency lighting, exterior pole lights and parking garage fixtures and office space troffers, Hubbell Lighting has the solutions for all healthcare facility lighting applications.

John Hollander, Director of brand development at Hubbell Lighting, said, "We have focused on the needs of the patient, medical personnel and facility management to create solutions that support the healing process and respond to the operational concerns of these facilities. In the patient room specifically, the lighting must support tasks that range from a patient reading a magazine to a physician conducting a critical medical evaluation. This can only be accomplished with luminaire designs that are more architectural and less institutional in appearance – responding to the movement of a more inviting and relaxed environment for the patient." ■

Leviton establishes new lighting business unit

Leviton has consolidated its recent lighting acquisitions into one new Leviton Lighting Business Unit, positioning the company to deliver the broadest portfolio of innovative, high-performance and sustainable lighting solutions and fixtures in the industry.



John Ranshaw

This reorganisation strategically aligns Leviton's recent acquisitions of JCC, Contech Lighting and Intense Lighting under one leadership team. John Ranshaw, former president of Contech Lighting, will serve as vice president and general manager of the newly integrated Leviton Lighting Business Unit, focusing on continuing to expand Leviton's lighting product offering, sales footprint and continuous improvement in delivering the highest level of customer service.

Ranshaw said, "As a company, Leviton's deep bench of lighting knowledge and expertise is now organised to operate efficiently, innovate quickly and maintain its industry leadership position. We look forward to developing even more comprehensive and exciting lighting solutions for commercial, hospitality, supermarket, retail and residential customers in the future." ■

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Soraa chosen to vividly illuminate one of the world's largest antique galleries

Soraa, a well known leader in GaN on GaN LED technology, revealed that its VIVID LED lamps have been installed at historic M.S. Rau Antiques located in the French Quarter of New Orleans, Louisiana. With 25,000 square feet, M.S. Rau Antiques is one of the largest premier fine arts and antiques galleries in the world.

Recently, the gallery hosted a special exhibition exploring the best of Napoléonic art and design. The exhibition revealed how Napoléon Bonaparte effectively used art and design to cultivate an image of power and offered an intriguing glimpse in the intimate life and ultimate legacy of the soldier, statesman and ruler.



Photo credit: M.S. Rau Antiques

After vigorous testing and research into options for the lighting retrofit, Mead Jones, the lighting specialist at M.S. Rau Antiques, chose Flicker Free MR16 lamps with VIVID LED technology to illuminate the Napoléonic art and design exhibition, as well as future exhibitions. Soraa's uniform controlled light source has the consistent accurate color rendering needed for the exhibition's objects, including fine art, furniture, books and accessories. Soraa's LED lamps also provided the beam control for ambient and atmospheric design that M. S. Rau desired.

In addition to creating a more controlled and inviting atmosphere for the gallery, the lighting upgrade for M.S. Rau Antiques was eligible for an EnergySmart grant. With a complete switchover from the quartz halogen lamps to Soraa lamps, the gallery expects to save nearly \$20,000 in annual energy costs. ■

MEGAMAN opens showroom in Shanghai

Having a flagship showroom in Shanghai places MEGAMAN in the heart of the growing economy and shows that the brand is back and there to stay. Located within their Shanghai office building at Huangpu district, the new facility will enable visitors to view extensive product range in detail, as well as experiencing real life lighting effects within the various demonstration environments. This showroom is designed to demonstrate just how aesthetic and energy-efficient lighting solutions can be using MEGAMAN LED lamps and fittings. The facility features our innovative LED lighting products in use within different environments, including fashion, jewellery and office settings, as well as hospitality environments such as reception area, bar and cafe.



Ray Kwan, General Manager, MEGAMAN (China) Electrical & Lighting, said, "MEGAMAN's move to Shanghai demonstrates the brand's growth and expanding network and this showroom will act as a shop window for anyone interested in MEGAMAN. They will be able to take a look at our innovative LEDs and the professional lighting solutions we are providing, and gain an insight into the modern MEGAMAN brand and the direction it's going in digital platform of smart lighting." ■

Over 21 lakh LED Street Lights installed across India under SLNP

Under the Government of India's (GoI) Street Lighting National Programme (SLNP) over 21 lakh conventional street lights have been replaced with LED street lights across the country. The newly installed lights have led to brighter streets, feeling of enhanced safety and security among the residents and motorists. Energy Efficiency Services Limited (EESL), a Public Energy Services Company under the administration of Ministry of Power, GoI is the implementing agency for SLNP.

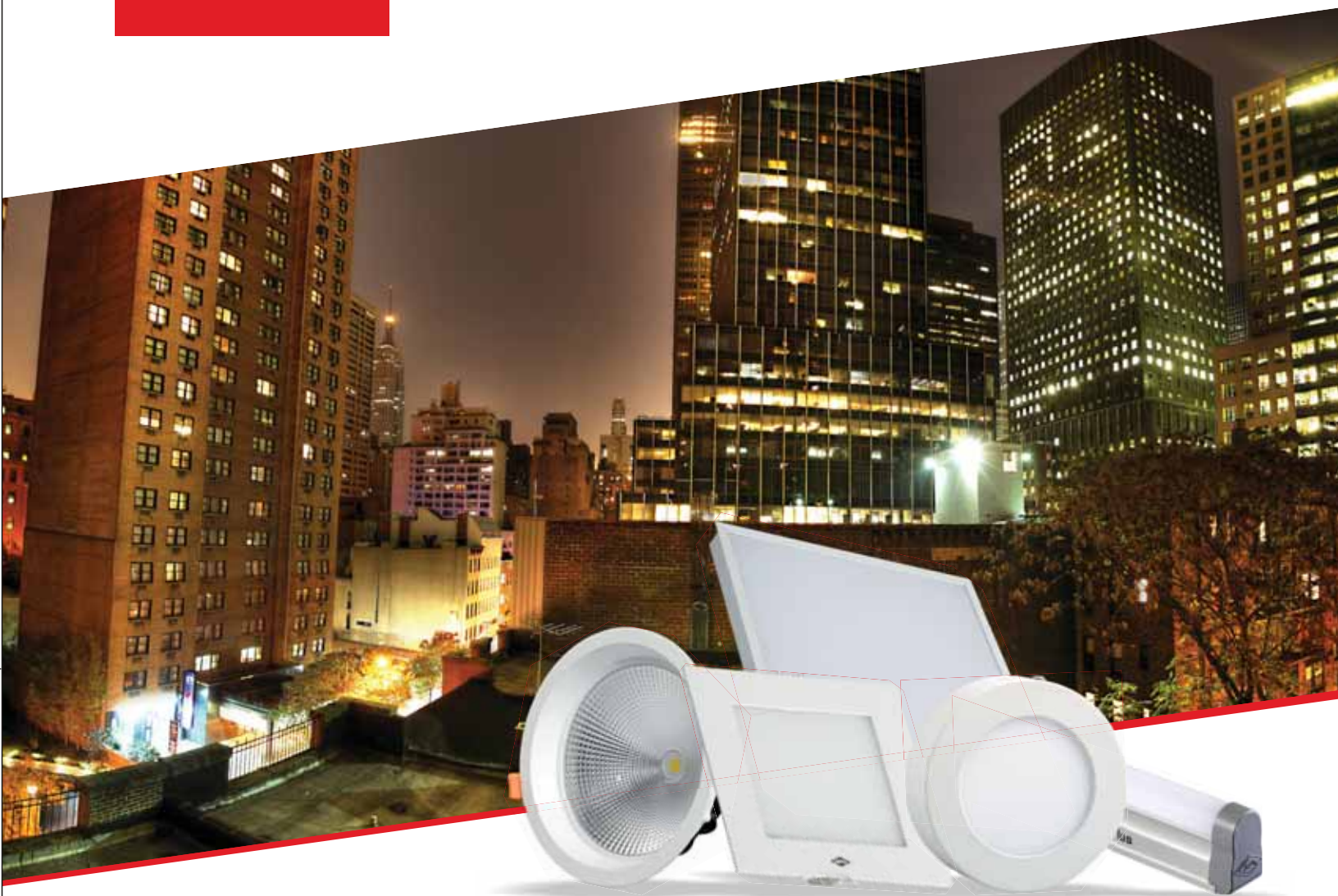
The installation of LED street lights has resulted in Annual energy savings of 295 million unit kWh, avoided capacity of over 73 MW and reduction of 2.3 lakh tonnes of CO₂ annually. The project has been implemented across 23 states and union territories. The lighting level on roads have increased significantly after the replacement. The highest replacement of LED lights has happened in the following states:

State	Number of Street Lights	Energy Saved per year (kWh)
Rajasthan	7,04,891	99,054,808
Andhra Pradesh	5,86,037	82,352,849
Delhi	2,64,185	37,124,579
Gujarat	2,00,536	28,180,321
Goa	94,856	13,329,639

EESL is also implementing a special heritage lighting project, wherein 1000 LED street lights have been installed in Kashi region of Uttar Pradesh, and another 4000 lights are being installed. ■



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Alok Ghose becomes MD and Cluster Leader for Singapore, Malaysia and Export markets



Alok Ghose

Philips Lighting, a well known leader in lighting, has appointed Alok Ghose as the Managing Director (MD) and Cluster Leader for Singapore, Malaysia and Export markets. In addition to overseeing the Malaysian operations for Philips Lighting, his new remit now includes leading the Singapore and Export operations for Myanmar, Brunei, Laos, and Cambodia.

Ghose will continue to be based out of Philips Lighting's office in Malaysia in his expanded role, and will report to Patricia Yim, Market Leader for Philips Lighting ASEAN Pacific.

A long-standing member of Philips Lighting's global business development team, Ghose has

over two decades of experience in the global lighting industry, having held business development roles across the Asia Pacific, Middle East, Africa, Russia and Latin America as well as in the Netherlands.

A stalwart supporter of innovation as a key growth driver, Ghose led his team to conceptualise and launch the very first LED solutions in the world almost a decade ago. Today, LED lighting sales make up approximately 55% or more than half of the Philips Lighting business. He was also instrumental in setting up Philips Lighting's Home Lighting segment, which continues to operate from a position of strength today. ■

Tempo hires Jill Rebik as New York Metro Sales Manager



Jill Rebik

Tempo Industries, LLC (Tempo), an award-winning manufacturer of configurable linear LED lighting reveals the addition of Jill Rebik as the company's New York Metro Sales Manager. Jill will focus on the New York City market and contribute to the organisation's national and international growth by supporting the specification needs of the local lighting design community.

Along with her enthusiasm for lighting and highly developed professionalism, Rebik brings to Tempo seventeen years of lighting industry experience working for lighting manufacturers in sales management roles with a focus on architectural LED lighting. Most recently, Rebik

served as Regional Sales Manager for Eaton with responsibility for all LED specification grade brands and prior to that position she was the Northeast Regional Sales Manager for io Lighting.

Rebik has been active in New York's lighting organisations including the Illuminating Engineering Society (IES), the Designers Lighting Forum of NY (DLFNY), and various sponsored events and tradeshow. She has also been professionally involved with key educational institutes including being a guest lecturer at Parson's School of Design. Rebik will continue to expand her relationships within these organisations and support the lighting design community. ■

Martin Drumm joins Penn Elcom



Martin Drumm

Designer and product specialist Martin Drumm joins the Penn Elcom team, bringing his vast experience, zest for innovation and imaginative flair to the company's legendary flightcase and racks hardware division, where he will be designing and develop cool new products and bringing them to the market.

Martin, who describes himself as 'creative and a little crazy ... in a good way', is based near Frankfurt in Germany. He's worked for many high profile industry flightcase manufacturers over the years and his inventions in this area have included - famously - SIP foam inserts for moving lights, together with various ingenious wheel plates, butterfly catches, corner handles, cap locks, rivet protection dishes, etc., all of which are now essential everyday working solutions used

universally across the professional entertainment and AV industries.

Known for lateral and 'out-of-the-box' thinking in the quest for neat solutions, he will be travelling to Penn's manufacturing facilities worldwide - currently the U.K., U.S.A, Latin America and Asia - where he will be working with existing staff, training new personnel and co-ordinating a network of design studios. All of this will add to Penn Elcom's efficiency and ability to respond quickly to new industry and client demands and trends.

Martin's initial projects at Penn include the organisation of a whole new production range of flightcase hardware which will benefit customers building their own quality case products who will be able get all the materials needed from a single source - Penn Elcom. ■

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Eaton's Halo product line named the Lighting Leader by BUILDER Magazine Readers

Power management company Eaton, a U.S. Environmental Protection Agency's 2017 ENERGY STAR Partner of the Year – Sustained Excellence Award recipient, revealed that BUILDER magazine's 2017 Brand Use Study named its Halo product line the brand leader in lighting. Awarded for an unprecedented 19th consecutive year, the Halo product line of recessed, track and surface lighting products was given top honours, sweeping all four lighting categories of Brand Familiarity, Brands Used in the Past Two Years, Brands Used the Most and Quality.

The survey rates important factors influencing the brand selection process that include product performance, price,



availability, warranty, ease of installation, manufacturer's reputation and relationships, as well as green/sustainable features.

Glenn Siegel, director, marketing and product management, Eaton's Lighting Division, said, "Once again we are honoured to receive this recognition and appreciate the ongoing support of builders, builders/developers and general contractors. For more than 60 years, our state-of-the-art engineering, on-going research and development, meticulous product standards and the tradition of unparalleled service has distinguished the Halo product line the building community knows and trusts."

Wipro Lighting wins Red Dot award

Wipro Lighting, part of Wipro Enterprises (P) Ltd., India's well known LED lighting company, has won the prestigious Red Dot Award: Product Design 2017 for its lighting product – VERGE LED, in the product design category.

VERGE LED is Wipro's signature lighting product for modern work-spaces designed by the company's industrial designer Prajakta Rokade. It blends in innovatively and captures the essence of any workspace. VERGE LED enhances the elements of the space it is going to belong, creating a unique volumetric lighting experience.

Red Dot Award: Product Design 2017 is a well-regarded



international design competition. For over 60 years, an expert team awards the seal of quality for good design and innovation to the outstanding designs of the year. This year, a jury of around 40 independent designers, design professors and specialist journalists evaluated each individual product. The competition assessed 5,500+ entries from 54 countries.

Anuj Dhir, Vice President & Business Head, Commercial Lighting, Wipro Consumer Care and Lighting, said, "Design & Innovation is a way of life at Wipro. We are delighted to win this award, a testimony to our focus on innovation and encourages us to bring in more innovation and value to our customers."

Zumtobel honoured once again

Founded in 1950 by the renowned architects Ray and Charles Eames, Eero Saarinen and MoMa curator Edgar Kaufmann Jr., the 'Good Design Award' from the Chicago Athenaeum, Museum of Architecture and Design and Metropolitan Arts, has now established itself as an internationally recognised symbol for innovative design. Adding ONDARIA to the elite list of Good Design Award winners therefore represents special acknowledgement of the exceptional work carried out by Zumtobel.

The consistent and congenial form of the round luminaire delivers soft wide-area light, creating perfect harmony between the physical design and the lit effect. The precise basic geometry incorporates gentle outer contours to provide a balanced overall look, making sure that the non-directional luminaire blends flexibly into any room to deliver a welcoming general

ambience.

ONDARIA designer Stefan Ambrozus achieved a special fluidity and depth effect by incorporating the inwardly off-set and concave-arched luminaire surface. Homogeneously illuminated, these contours also ensure that the actual light source remains completely concealed. A subtle indirect light component for ceiling illumination further emphasises the three-dimensional effect of the product.

Offered as a recessed, surface-mounted or pendant version and available with three different diameters, the circular LED luminaire enriches public areas such as lobbies and foyers, communication rooms, lounges, hallways and stairs. The pleasant homogeneous light distribution and soft shadows generate a cosy atmosphere, enhancing the sense of wellbeing and enlarging spaces visually.



Prominent players in this market are General Electric Company (U.S), Acuity Brands Lighting Inc. (U.S), Cree Inc. (U.S), Eaton Corporation PLC...

Hospital Lighting Market to be worth 7.03 Billion US\$ by 2021

According to a report by MarketsandMarkets, the hospital lighting market is projected to reach US\$ 7.03 Billion by 2021 from US\$ 5.19 Billion in 2016, at a CAGR of 6.2% from 2016 to 2021. The major factors contributing to the growth of the global hospital lighting market include the increase in adoption of LED technology, increasing size of hospitals in Europe and North America and technological enhancement will offer new opportunities during the forecast period.

The report segments this market on the basis of product, technology, and application. On the basis of product, the market is segmented into troffers, surface-mounted lights, surgical lights and other products. In 2016, the troffer segment is expected to account for the largest share of the market due to increasing number of hospitals in Asian countries and surging adoption of LED based troffers in hospitals globally.

Based on technology, the market is segmented into fluorescent, LED, renewable energy and other technologies. In 2016, the fluorescent segment was expected to account for the largest share of the market due to lowest cost and low operational cost. The average operational cost of a fluorescent bulb for 23 years is nearly US\$ 48 and the average cost per fluorescent bulb is approximately US\$ 2.

On the basis of applications, the market is segmented into patient wards & ICUs, examination rooms, surgical suites and other applications. The patient wards and ICUs segment is projected to witness the highest growth during the forecast period. The technical enhancements and increasing adoption of LED based fixtures in hospitals wards are the major factors driving growth of this application segment.

On the basis of geography, North America dominates the global hospital lighting market. Growth in the North American segment is primarily driven by the technological advancements, government initiatives. For example, the development of Indigo-Clean a product by Kenall Manufacturing launched in 2015, using continuous environmental disinfection technology. Indigo-Clean features technology that continuously disinfects the environment. Such a technological advancement will drive the demand for lights in hospitals.

Prominent players in this market are General Electric Company (U.S), Acuity Brands Lighting Inc. (U.S), Cree Inc. (U.S), Eaton Corporation PLC (Ireland), Hubbell Incorporated (U.S), Koninklijke Philips N.V. (Netherlands), and Zumtobel Group AG (Austria). Other players in this market include Herbert Waldmann GmbH & Co. KG (Germany), KLS Martin Group (Germany), and Trilux Lighting Ltd (U.K). ■



Illumination of 100-year Old Mysore Palace

The palace is lit up for one hour (7 pm to 8 pm) during Sundays and Public holidays with Police Band Performance. On the other days there is colourful Sound & Light show between 7 pm to 7.45 pm. During these 15 minutes, the palace is illuminated with almost one lakh bulbs...

Mysore has a number of historic palaces, and is commonly known as the City of Palaces. Nevertheless, the term 'Mysuru Palace' specifically refers to one within the old fort. The palace was commissioned in 1897, and its construction was concluded in 1912. It is now one of the most famous tourist attractions in Mysore. The architectural style of the palace is commonly described as Indo-Saracenic, and blends together Hindu, Muslim, Rajput, and Gothic styles of architecture. It is a three-storied stone structure, with marble domes and a 145 ft five-storied tower. The palace is surrounded by a large garden.

Mysore Palace illuminations were done around 75 years back by putting 2 No's of 1000 KVA Transformers and 2 No's

of 500 KVA Transformers. These Distribution Transformers are of specialised category and it's of Delta-Delta type where as in; general Distribution company's in India are making use, if the Distribution Transformer of type Delta-Star with neutral point. Earlier Voltage supply class was 4.6Kv/250v and at later stage it was upgraded to standard 11Kv/250v class.

Power supply to Mysore Palace is arranged from CESCO, Karnataka Government Electricity Distribution Company at 11 Kv voltage class. For the convenience of tourists and security point of view there are 4 different 11kV feeders, which are connected to Mysore Palace Board Power station for arranging uninterrupted power supply.

Earlier the Ornamental Light fittings, Flood Light fittings and other electrical fittings in and around the palace were of incandescent bulb type. For the last five years they have been replaced by LED fittings for energy conservation as well to reduce the CO₂ (Carbon-di-oxide) emission.

But main palace and all gates external illuminations circuits are connected with almost one lakh 15 watts screw type incandescent transparent bulbs. Earlier these bulbs were of 30 watts capacity and at later stage its capacity was cut





down to 15 watts without affecting the illumination of the palace. At the time of illumination, the palace glitters in the Golden Form incandescent bulbs.

Palace Board Authority took a decision to replace the existing incandescent bulb by Eco-friendly LED bulb three years back. As a pilot project few circuits of incandescent bulbs in one temple area were replaced by LED bulbs, but its emission was like silver and not in golden yellow form. Hence, this proposal was dropped by the Technical Committee and suggested to adopt LED bulb in future if manufacturers do the R & D and supplies LED light with golden emission so as to maintain the same Golden illumination. In this regard, Palace Board has already consulted many famous Electrical bulbs manufacturer to do the R & D in this & if required

golden emission is obtained from the manufacturer, existing incandescent bulbs will be replaced by LED bulbs in future.

The average energy consumed per annum is 6, 10,000 units (KW/hr), amounting to Rs.77 lakhs per annum. The palace is lit up for one hour (7 pm to 8 pm) during Sundays and Public holidays with Police Band Performance. On the other days there is colourful Sound & Light show between 7 pm to 7.45 pm. During these 15 minutes, the palace is illuminated with almost one lakh bulbs. ■

Source

Mysore Palace Board

Reliable Even Under Harsh Conditions

Warehouses, factories and multi-storey car parks all need robust luminaires that provide high lumen values. Industrial lighting has to be energy-efficient and durable. Tridonic offers the right LED light sources for diffused lighting in the form of its CLE G1 ADV IND and QLE G1 ADV IND modules. A luminous flux of 26,000 lumen per module and three different colour temperatures of 4,000, 5,000 and 6,500 K make it easier to develop and manufacture LED high-bay luminaires for industrial applications...

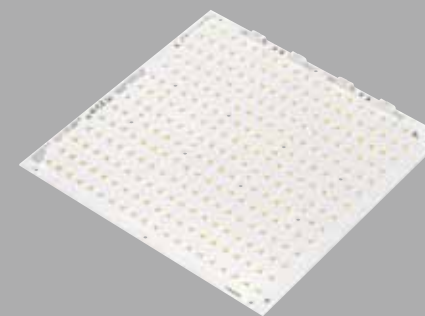
Industrial environments place special requirements on lighting systems. Long operating times and critical atmospheres impose heavy demands on any lighting system, and maintenance is often associated with major effort and high costs. The luminaires are often difficult to access so production is disrupted and machinery has to stand idle.

The following four examples illustrate the specific demands of these situations and the benefits of LED lighting. Long-life components with high light output reduce the number of luminaires needed and the maintenance costs in high-ceiling rooms such as warehouses. In production facilities, high quality of light and high illuminance lead to an increase in



productivity and also help improve safety and reduce errors. In cold rooms, a good lighting system should operate reliably and provide full luminous intensity within only a short time despite low ambient temperatures. In multi-storey car parks, the lighting components need to be energy-efficient and durable, with low maintenance costs.

For such applications, Tridonic combines the benefits of the indoor segment with those of outdoor products. This results in LED solutions with high efficiency, low standby losses and increased dielectric strength for extended temperature ranges. LEDs modules are perfect replacements for fluorescent and HID light sources as they meet the requirements for industrial lighting. The round CLE modules provide uniform illumination. They are suitable for use in wall lights, for example. The rectangular QLE modules are also suitable for ceiling luminaires.



Offering a luminous flux of 26,000 lm, they were developed for luminaires designed to be installed at ceiling heights of up to 16 metres. They are based on standard boards, and luminaire manufacturers can therefore add them to their portfolios without the cost of developing new optics. The modules offer a high module efficiency of up to 153 lm/W (tp=85 °C). Reproducible colour rendering is specified as MacAdam 3. Tridonic offers an 8-year guarantee on the modules, which have a nominal life of 100,000 hours.

Luminaire manufacturers will be offered drivers compatible with the LED modules. LED Drivers from Tridonic for industrial applications are designed to reduce stress on the modules so they achieve long service lives (thermal load/peak voltage). The LCI 100W-1050mA OTD EC driver with overtemperature protection and overvoltage protection up to 6 kV (between L/N and earth) is suitable for the CLE ADV IND module, for example. ■



“Learn to observe the light of your everyday experiences & how they affect you”

Japhy Weideman designs lighting environments for theater, opera, and other live events. His designs have been experienced throughout the United States, Europe, and Asia. He shares his journey with **Lighting India...**

What led you to light design?

Q I've always been interested in how we, as humans, perceive the world. When I started undergrad studies at the University of New Mexico in Albuquerque, I had never been exposed to live theatre. I was studying an array of disciplines such as sociology, political science, English Lit, painting, and photography— and I needed an elective credit so I decided to take a course called 'Intro to Stage Lighting'.

My lighting professor, John Malolepsy, proved to be far beyond anything but a normal teacher. He is not only an amazing set and lighting designer, he's an advanced philosopher of all things related to light. His courses covered everything from the myth of Prometheus, the Egyptians and how they aligned the great pyramids, the physics of the eye and how our brain translates electromagnetic energy into a visual picture, as well as basic theory of Einstein Relativity of time and space. He taught me to dissect every day reality into an experience defined by the light that inhabited each moment.

The key is to become a keen observer of your emotional state and connect that to the visual information generated by the light surrounding one's experience.

If you watch closely at all times, you will begin to learn about how deeply light affects your everyday feelings.

I began applying some of these teachings into my own practice while designing student shows (theatre and

dance) and experimenting in the lighting laboratory.

In the summer between semesters, I did an apprenticeship at The Santa Fe Opera in New Mexico. Five seasons there proved to be fertile ground for professional learning, allowing me to build relationships with new peers, and to work with world-class designers. I moved to NYC in the summer of 2001 and in the beginning I had to do a lot of different jobs just to pay the rent. I worked as an electrician in small theaters and also as a console programmer. I assisted a very talented lighting designer named Jim Vermeulen for whom I was lucky to work with; he introduced me to a lot of other important people in the New York Theatre community. I was lucky because the very first show I designed in NYC was nominated for a Drama Desk award. It was presented at Soho Rep in 2004 titled *FRANKENSTEIN* by a fantastically inventive downtown theatre company called The Flying Machine. Their shows were deeply image based, lots of simple, yet stunning lighting effects were used and thus the lighting got a lot of attention on the show. My second big break came in 2005 when I was asked by the great German director Peter Stein to design David Harrower's *BLACKBIRD* at The Edinburgh International Festival in Scotland. I met Peter because I had worked as an associate for a few years under the master opera lighting designer Duane Schuler who designed many of Peter's shows. Duane was a very important mentor in my life and gave me many

opportunities along the way. He was not available to design the play so Peter felt I was up to the task. BLACKBIRD was a critical success in Edinburgh and thus transferred to London's West End. But the most recent lucky break came to me from director Jack O'Brien. Jack had seen a few shows I designed at Lincoln Center and one day I got a call from him asking me to design THE NANCE starring Nathan Lane on Broadway. I could not believe my ears. Guess it worked out because it landed me my first Tony Nomination in 2013.

Can you explain a bit about the creative process with regards to lighting for a Broadway show? (From conception to being onstage).

Q In the early stage of design, I always begin with reading the text and listening to the music prior to having a meeting with a director or other designers. It's very important to get one's own impression of the piece before being influenced by others. In some projects I am brought in before a set design has been created; and in others there is already a design in process. Once I see the geography of the environment we are working in, we create a lighting plan that contains lots of flexibility. There will be clear ideas which get implemented in the beginning, but there is always a need to create unknown visual images yet to be discovered.

Regardless of what kind of show I am working on, the real creative process for me begins when we start focusing lights on stage. I never really know what a particular piece is going to look like until I get in the room and start experimenting. While I begin with a system of light that I feel will provide a piece with the right quality and variety of light, I find that there is always a secret visual code waiting to be unlocked. Often I will see strong images revealed through a mistake. For example, I might turn on a light that happens to be pointed down into the corner of the room, not where it's intended to go, but in this accident it may create a haunting halo around the back edge of the set, or possibly a strong shadow. The result will be something unique and beautiful which in turn leads me down a different path of how to shape that particular environment. It's a process of discovering clues that lead to the essence of the visual language.

Congrats on your Tony nomination for Dear Evan Hansen. I would imagine this show, in particular, was quite complex as far as designing the lights, considering it involves many projections as well as really making the audience feel what it was like to go inside the mind of Evan. Can you talk a bit about how you came up with these ideas and how you can manipulate lights to create such strong feelings within the world of the musical and influence the audience's feelings as well?

The lighting, working hand in hand with the music, is a very important, symbiotic relationship for the design.

A There is a unique scientific connection between frequencies of light and sound that has been explored by scientists and artists throughout history. Basically, I interpret the emotional frequencies of the music in Paul and Pasek's score into a visual picture. It can not be explained as to how this is done, other than emotional instinct. I manipulate the angle and quality of the light until it most closely reflects the feeling of the musical tones.

One of the strong elements that can be seen in the design is that we use many shades and sizes of intense beams of light from above during special moments in the music.



Photo: Matthew Murphy

The beams range from piercing tight blue-white pinpoints (like the iconic moment in WAVING THRU A WINDOW when all of the characters create a circle around Evan and are suddenly revealed in a circle of interconnecting beams), to intense thick golden columns of sunlight (FOR FOREVER). The beams sometimes form geometrical intersections, creating a kind of aerial architecture that weaves the interrelationships of the characters together. While these light beams serve as a way to draw the eye directly to the actor, they also serve to connect them to the divine and mysterious, always emanating from above. The result of this multifaceted approach generates an evocative atmosphere that results in an unforgettable visceral audience experience.

Q What inspires you to pursue specific projects?

A For me it's about working with fellow collaborators that inspire me. It's less about the type of show or subject matter that interests me; it's all about the people.

The process of making theatre is collaborative. It's about sharing ideas with fellow artists and bringing out the best of each others talents in order to tell stories.

Q Any advice for those wanting to become a lighting designer?

A Learn to observe the light of your everyday experiences and how they affect you, watch and listen always, wherever you are. Don't spend all of your time in the theatre or studying design. Become infinitely curious about life and all things art. Travel the world. Be a passionate lover. Make friends everywhere you go. ■

Energy Performance Assessment of Lightning System Like LED Lighting Device

In this article, authors have given the focus on Technical Lighting and Lamps particularly with the case study they have explained why LED lights (lamps and LED tube lights) are to be used in educational campus instead of other lightning system.

Introduction of energy performance assessment of lightning system:

Lighting is provided in industries, commercial buildings, indoor and outdoor for providing comfortable working environment. The primary objective is to provide the required lighting effect for the lowest installed load i.e highest lighting at lowest power consumption.

The purpose behind 'Performance Test':

Most interior lighting requirements are for meeting average luminance on a horizontal plane, either throughout the interior, or in specific areas within the interior combined with general lighting of lower value.

The purpose of performance test is to calculate the installed efficacy in terms of lux/watt/m² (existing or design) for general lighting installation. The calculated value can be compared with the norms for specific types of interior installations for assessing improvement options.

The installed load efficacy of an existing (or design) lighting installation can be assessed by carrying out a survey as indicated in the following pages.

Important Terms in Lightning

Lumen is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

Lux is the metric unit of measure for luminance of a surface. One lux is equal to one lumen per square meter.

Circuit Watts is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

Installed Load Efficacy is the average maintained luminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m²)

Lamp Circuit Efficacy is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

Installed Power Density - The installed power density per 100 lux is the power needed per square metre of floor area to achieve 100 lux of average maintained luminance on a horizontal working plane with general lighting of an interior. Unit: watts per square meter per 100 lux (W/m²/100 lux)

$$\text{Installed power density (W/m}^2\text{/100 lux)} = \frac{100}{\text{Installed load efficacy (lux/W/m}^2\text{)}}$$

$$\text{Installed Load Efficacy Ratio (ILER)} = \frac{\text{Actual Lux/W/m}^2}{\text{Target Lux/W/m}^2} \text{ or } \frac{\text{Target W/m}^2\text{/100lux}}{\text{Actual W/m}^2\text{/100lux}}$$

Average maintained luminance is the average of lux levels measured at various points in a defined area.

Colour Rendering Index (CRI) is a measure of the effect of light on the perceived color of objects. To determine the CRI of a lamp, the colour appearances of a set of standard colour chips are measured with special equipment under a reference light source

Preparation before measurement

Before starting the measurements, the following care should be taken:

- All lamps should be operating and no luminaries should be dirty or stained.
- There should be no significant obstructions to the flow of light throughout the interior, especially at the measuring points.
- Accuracies of readings should be ensured by
 - Using accurate luminance meters for measurements
 - Sufficient number and arrangement of measurement points within the interior—Proper positioning of luminance meter
 - Ensuring that no obstructions /reflections from surfaces affect measurement.

The interior is divided into a number of equal areas, which should be as square as possible. The luminance at the centre of each area is measured and the mean value calculated. This gives an estimate of the average luminance on the horizontal working plane.

Step by step procedure of lightning system To Determine the Minimum Number and Positions of Measurement Points

Calculate the Room Index: $RI = L \times W / H_m(L + W)$

Where L = length of interior; W = width of interior; H_m = the mounting height, which is the height of the lighting fittings above the horizontal working plane. The working plane is usually assumed to be 0.75m above the floor in offices and at 0.85m above floor level in manufacturing areas.

Determination of Measurement Points

Room Index	Minimum number of measurement points
Below 1	9
1 and below 2	16
2 and below 3	25
3 and above	36

To obtain an approximately 'square array', i.e. the spacing between the points on each axis to be approximately the same, it may be necessary to increase the number of points.

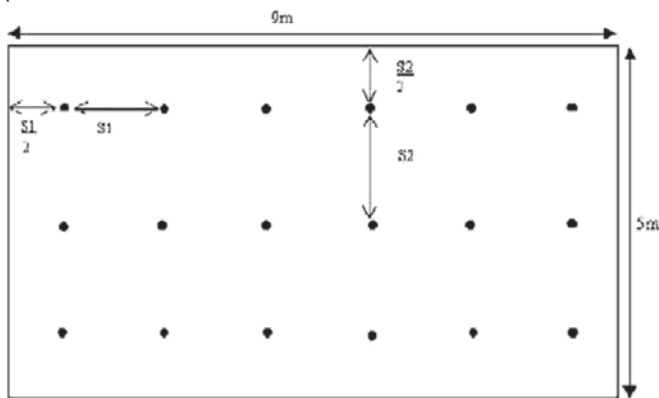
For example, the dimensions of an interior are:

Length = 9m, Width = 5m, Height of luminaires above working plane (H_m) = 2m

$$\text{Calculate } RI = \frac{9 \times 5}{2(9 + 5)} = 1.607$$

From above Table the minimum number of measurement points is 16

As it is not possible to approximate a 'square array' of 16 points within such a rectangle it is necessary to increase the number of points to say 18, i.e. 6 x 3. These should be spaced as shown below:



Therefore in this example the spacing between points along rows along the length of the interior = $9 \div 6 = 1.5$ m and the distance of the 'end' points from the wall = $1.5 \div 2 = 0.75$ m.

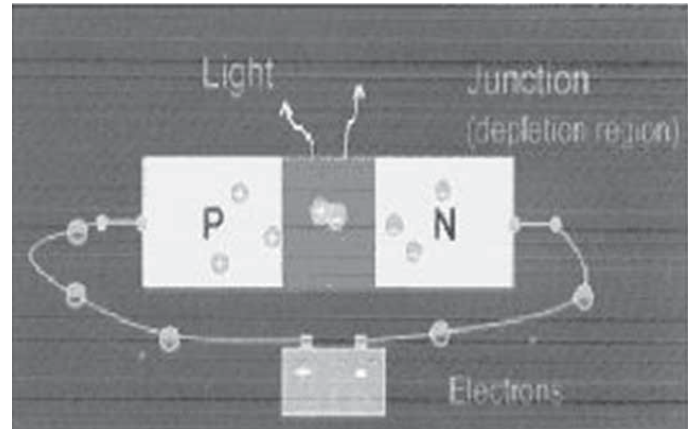
Similarly the distance between points across the width of the interior = $5 \div 3 = 1.67$ m with half this value, 0.83m, between the 'end' points and the walls.

In olden age, incandescence and fluorescence lamps

were the main focus in illumination technology. With continuous development

Led : Principle of Operation

LEDs differ from traditional light sources in the way they produce light. An LED, is a semiconductor diode. It consists of a chip of semiconducting material treated to create a structure called a pn junction.



When connected to a power source, current flows from the p-side (or anode) to the n-side (or cathode) and not in the reverse direction. The charge-carriers (electrons and electron holes) flow into the junction from electrodes. When an electron meets a hole, it falls into a lower energy level, and releases energy in the form of a photon (light). The specific wavelength or color emitted by the LED depends on the materials used to make the diode.

Recent Developments in Led Lighting

The efficacy of light source is measured in lumens/watt. The efficacy of LED is compatible with the present light source but the efficiency of LED lighting is very high. As in normal incandescence lamp is having efficacy of around 18 lumens/watts and LEDs are in the range of 40 Lumens/watt, but in incandescence lamps most of the power (watts) lost in heat as the efficiency of incandescence lamp is very low in the range of 10-15%. As there is no heat developed in LEDs this power towards heat will be reduced, only losses taking place will be in driver circuits which account for 10-15% losses, thus a higher efficiency in the range of 85-90 % can be obtained. That makes a potential difference in saving in energy in LED lighting. The research is going on in development of LED with high lumens/watt output. The maximum achieved efficacy is 132 lm/w, but it is yet to be commercialised. By passing a high current through a LED higher lumens/watt can be obtained with increase in power rating as well. Generally 1 w LEDs are considered high watt LED and are in use for illumination purpose.

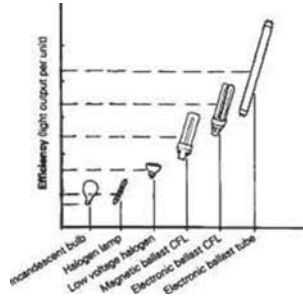
Organic light-emitting diodes (OLED) can be a revolutionary change in display purpose. With development of OLED, it is possible to make LED displays as thin as paper. An electronic paper which can be folded and carried away.

Such displays can be very useful for advertisement purpose.

Comparison of Leds with other type of light sources

As discussed earlier the efficacy of LEDs is not very high. Following chart shows the comparison of efficacy of various illumination schemes:

Type of Scheme	Efficacy (lm/w)
Incandescence	18-20
Fluorescent	60-70
Sodium Vapor	40-120
Mercury Vapor	50-60
Metal Halide	80-125
CFLs	50-80
LED	20-60



From above table it can be observed that the efficacy of LEDs is on par with CFLs, but as the driver losses are negligible and there no production of heat, thus giving higher efficiency.

Case Study for the Energy Conservation Awareness

Case study – I of replacing conventional lighting system (fluorescent) by LEDS and/or CFL:

In an Engineering college there were 113 conventional tube lights, the tube lights use to ON from 8 PM to 6 PM (Timing use to vary subject to season change). The tube lights were of standard make.

After testing on choke it was observed that chokes are consuming 13 watts of power (average).

Thus total power loss using tube lights $P_{Loss} = 113 \times 13 = 1469$ watts.

The tube lights (on an average) working for 10 hours a day. Total Energy loss per day = 14.69 kWh Financial Loss per day = 73/- @ 5/- per unit This amount for accounted per day only to make up the losses.

These fixtures were provided with 40 W tube lights.

Total power consumed with 40 W tube (for purpose of vigilance) = $113 \times 40 = 4520$ W

The financial burden = $4.52 \times 10 \times 5 = \text{Rs. } 226/-$

Total Expenditure per day (towards vigilance) = $226 + 73 = \text{RS. } 300/-$

In one year = Rs. 1, 09,500/-

i) If these lights were replaced with CFLs:

Lux obtained by a fluorescent Tube = 2200. The commercially available CFL of 15 W will provide a lux of 1000, so number of CFLs required to produce required lighting = 2 Power consumed by TWO CFLs = 30 Watts (53 watts in case of Tube lights).

NOTE: Though the lux produced by CFLs is less, it is sufficient enough to produce required illumination.

Power saved = $53 - 30 = 23$ Watts

Energy saved per day = $0.023 \times 113 \times 10 = 26$ units per day
Financial saving = $26 \times 5 = \text{Rs. } 130/-$ per day.

Saving over one year = $130 \times 365 = 47,450$, Rs. 47,450/-

Investment (Initial cost) to replace Tubes with CFLs

Cost of one CFL = Rs. 110/-

Cost of fitting to fix CFL = Rs. 12/- Total of one CFL with fitting = Rs. 122/- No. of tubes to be replaced = 113.

Equivalent number of CFLs = 226 (@ Two CFLs per tube light)

Total Initial investment = $226 \times 122 = \text{Rs. } 27,572/-$

Payback period = $27572/47450 = 0.58$ years = $0.58 \times 12 = 7$ (Approx. seven months).

ii) If tube lights were replaced with LED lighting system:

The white color LEDs, in LED Pack form (24 LEDs per pack) manufactured by SECO Instruments Pvt Ltd are used.

Two LED systems of around 1.4 - 2 W each will produce a required illumination that produced by one tube light.

Total power consumed by two LED systems = 4 W

Power saved = $53 - 4 = 49$ W

Energy saved per day = $0.049 \times 113 \times 10 = 55.37$ units

Financial Saving / day = $55.37 \times 5 = \text{Rs. } 277/-$ Per year saving = Rs.1,01,105/-

Cost of ONE LED system = Rs. 500/-

Total LED system required = $113 \times 2 = 226$ (@ 2 LED system per tube light)

Total cost of LED systems = $226 \times 500 = 1, 13,000/-$

Lighting system	Annual Saving	Investment	Pay back Period
Present	Nil	Nil	Nil
CFL	47450	27,570	6 months
LED	1,01,105	1,13,000	14 months

Pay Back period = $1, 13,000/1, 01,105 = 1.12$ Years = 14 months.

From above comparison it can be seen that by replacing the present system of conventional tube lights, energy saving potential is possible with CFLs and LEDs. The CFL system is seems to be have quicker pay back period. But the above analysis can be compared depends on the life of the Lighting system as well.

CFLs are having a life span of around 5000- 7000 hours. At the rate of 10 hours per day a CFL will not stand for more than two years. Thus an investment of Rs. 30,000/- is bound over two years. Whereas LED last for 75000 to 100000 hours. Taking 75000 hours life, a LED system will last for at least 10 years.

Comparing over 10 years: CFL system:

Saving in CFL system = Rs. 4,75,000/- Investment (5 times) = Rs. 1,32,000/-

Net Saving = Rs. 3, 43,000/-

Saving in LED system = 10, 00,000/- Investment (One time) = 1, 20,000/-

Nett Saving = 8, 80,000/-

It can be observed that CFL system is no way comparable with LED system, over a period of 10 years.

Note: Cost of technology is coming down and that of energy is increasing. The saving will be at higher side with increase in energy cost and investment will be at lower side with decrease in cost.

Case Study – II - about power saving in outdoor lighting at college campus

Presently, there is a following power consumption for outdoor lighting at one college.

- 1) Metal halide of 400Wattage rating: 12 nos.
- 2) Small halogen of 500Wattage rating: 10 nos.

In order to calculate the monthly power consumption and electricity bill for the present scenario if this outdoor lighting is remaining on during 6:30 pm to 6:30am daily. Considering the unit rate is 10 Rs for HT electricity plan.

Now, if we replace this lighting system by 100wattage LED light-4nos. and 70Wattage LED light-10nos. Calculate monthly power consumption and electricity bill for the same case. This lighting will remain on during 6:30 pm to 6:30am daily. Consider the unit rate is 10 Rs for HT electricity plan. If the rate of 100Wattage LED light is 3101.85 rs/piece and 70 Wattage LED light is 2212.96 Rs/piece. We can calculate payback period for the LED lights. Consider no any maintenance for LED fittings. Guaranty is 2 years for LED lights.

Here,

Total Energy used per day by Lightning load is: $((12 \times 400) + (10 \times 500)) \times 12$

= $9800 \times 12 = 117600 \text{ Wh} = 117.6 \text{ Units of power.}$

Total Cost per day = 1176 Rs.

Monthly cost = $1176 \times 30 = 35280/- \text{ Rs.}$

Now, if 100 W- LED bulbs = 4 Nos.

And 70W LED bulbs = 10 Nos are used, then

Monthly power consumption = $30 \times 12 \text{ Hr} (4 \times 100 + 10 \times 70)$
= 396 Units

Monthly cost = $396 \times 10 = 3960 \text{ Rs only.}$

Now, considering Total cost of LED = $10 (2212.96) + 4 (3101.85)$

= 34,537 Rs.

Total Payback period is = Total spending / saving per month.

= $34537 / (35280 - 3960) = 1.1027 \text{ Months} = 1 \text{ month and two days}$

Case Study – III –Energy Conservation in classroom by lightning

If no. of tube lights = 9 Rating: 40 W.

If number of fans = 8, rating: 75 W.

Time of operation: 8:00 am to 6:00 pm (10 hours)

Tariff plan: 5.22 Rs/unit

Daily Expenses = $10 (9 \times 40 + 8 \times 75) \times 5.22 = 48.920 = 50 \text{ Rs.}$

Monthly expenses = 1500 Rs.

Let, if 5 fans are installed as price of new fan = $2360 \times 5 = 11800/- \text{ Rs \&}$

And 5 tube lights are replaced as price of new LED tube light = $900 \times 5 = 4500/- \text{ Rs.}$

So, total installation cost = $11800 + 4500 = 16300/- \text{ Rs.}$

Now, rating of new tube light = 20 W and

Rating of new fan (preferably BLDC based) = 50 W

Daily expenses = $10 (20 \times 5 + 50 \times 5) \times 5.22 \text{ Rs} = 18.2 \text{ Rs}$

Monthly expenses = 550 Rs. (approx).

We will consider some financial parameters which should be also analysed while lightning scheme is to be selected.

[1] SPB (Simple Pay –Back period):

Simple Payback Period (SPP) represents, as a first

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approximation; the time (number of years) required to recover the initial investment (First Cost), considering only the Net Annual Saving:

The simple payback period is usually calculated as follows:

$$\begin{aligned}\text{Simple payback period} &= \text{Expenses} / \text{savings} \\ &= 16300 / 1500-550 \\ &= 17.15 \text{ months} \\ &= 1 \text{ and half year (17 months and 15 days)}.\end{aligned}$$

[2] Internal Rate of Return

This method calculates the rate of return that the investment is expected to yield. The internal

rate of return (IRR) method expresses each investment alternative in terms of a rate of return (a compound interest rate). The expected rate of return is the interest rate for which total discounted benefits become just equal to total discounted costs (i.e net present benefits or net annual benefits are equal to zero, or for which the benefit / cost ratio equals one). The criterion for selection among alternatives is to choose the investment with the highest rate of return.

The rate of return is usually calculated by a process of trial

and error, whereby the net cash flow is computed for various discount rates until its value is reduced to zero.

The internal rate of return (IRR) of a project is the discount rate, which makes its net present value (NPV) equal to zero.

[3] Net Present Value

The net present value (NPV) of a project is equal to the sum of the present values of all the cash flows associated with it.

$$\begin{aligned}\text{NPV} &= \frac{\text{Periodic cash flow} - \text{Initial investment}}{(1 + R)^{1.5}} \\ &= \frac{(1500 \times 17.15) - 16300}{(1 + 0.07)^{1.5}} \\ &= 8515 \text{ Rs.}\end{aligned}$$

Conclusion

In this article, authors have given the details of basics lightening about LED and explained the technical parameters of LED. Authors have also shown the case study for various lightning schemes. Some financial terms relevant to Lightning and Energy Conservation are also explained. ■



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ActiveLED releases a New LED Lighting Technology

ActiveLED, Inc., a U.S. based innovator and manufacturer of performance LED lighting luminaires, recently revealed that it has formally introduced LUM-INTENSE, a new LED lighting luminaire technology that combines recent advancements in LED Modules, Drivers and Optics to punch an intense amount of light out of smaller LED fixtures. Designed to give significantly more Lumens per Watt, this technology delivers more Foot-candles at Task Level while eliminating most glare and light pollution often associated with many other styles of LED fixtures.

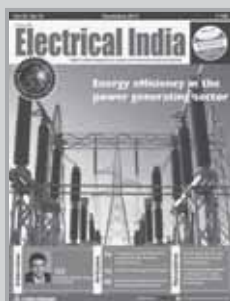
Klaus Bollmann, CEO of ActiveLED, said, "ActiveLED has always been an innovator of solid-state technology. With the launch of LUM-INTENSE LED Lighting Technology, we continue to lead the way in developing performance



LED technology that persistently revolutionises the standards of LED lighting. Customers can expect us to consistently deliver better, cooler, longer-lasting lights that match or exceed the light output of most other fixtures while using a fraction of the Watts."

LED fixtures that feature LUM-INTENSE are all Dark Sky Compliant. "An important part of the LUM-INTENSE Technology," Bollmann continued, "is the ability to eliminate most glare and light pollution by the use of advanced optics to focus the LED fixtures light output at ground or task level."

ActiveLED plans to incorporate LUM-INTENSE LED Lighting Technology into their entire line of high-performance LED luminaires. The LUM-INTENSE Label will be prominently displayed on all product specification sheets that incorporate the ground-breaking new technology. ■



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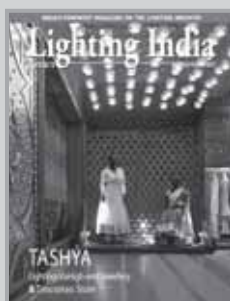
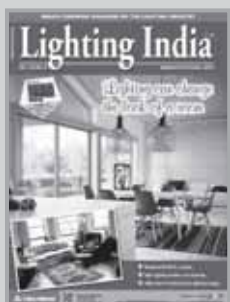
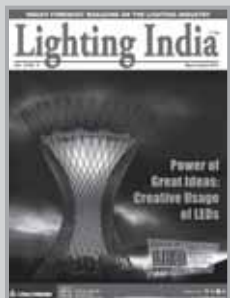
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“Luminous plans to be a strong contender in consumer functional LED lighting”

In the last one decade the lighting industry in India has changed a lot. We have seen the process of transition from CFL to LED lights. In the process, we have seen the possibility of tremendous savings in terms of energy consumption. **Lighting India** speaks to **Vipul Sabharwal, Managing Director, Luminous Power Technologies** as they have forayed into LED lighting solutions...

Q What is your comment on the growth of the Global and Indian lighting industry?

A Global LED lighting market is growing at the pace of 30 - 40% per annum as per industry estimates. The growth is in all segments of lighting like residential, commercial, industrial, outdoor, sports and entertainment. The LED market in India is growing at a healthy pace of 45% (as per Elcoma) with key drivers like higher efficiency and affordability. The consumer LED business is driven by extensive LED promotion programme of government of India under DELP. The programme has helped in creating awareness of LED technology among masses and early adoption. The Indian LED lighting industry will continue to grow with more solutions available which are high on performance and at consumer-friendly prices.

Q What opportunities did you see for foraying into LED lighting solutions for home Lighting?

A Luminous has a heritage of 28 years of being the trusted brand in the energy Space. We are market leaders in Inverter Batteries and strong contender in home electrical business. Luminous' name itself means 'Light Up' which makes us obvious player in the LED space. With the launch of LED lighting, our offerings get complete as we will be able to offer complete home electrical solution like invertors, batteries, fans, switches, wires and lighting. We have strong footprint of 50,000 selling points across India, which will help us reaching out to pan India consumers within a short time span.

Q What do you say about the quality of the LEDs available in India?

A LED technology makes lighting digital and LED products are a combination of LED chips, housing, electronics and holders. The LED solutions currently available in the country are a mix of products locally manufactured and imported. As the LED manufacturing is a complex process, it requires high level of control to ensure the quality product delivery. We at Luminous strongly believe in

System Control right from product design, specifications, components, system control, manufacturing process, line audits and finished good quality control. With our knowledge of energy conditions in India, we at Luminous will be able to upgrade our consumers to a better quality of LED lighting experience.

Q What are the next steps you have planned in?

Luminous is committed to bringing wide range of consumer functional LED lighting solutions, which help the consumers lead an active life. Our key message for LED lighting solution is 'Bright Light to Life Bright'. We are launching 100+ products pan India which will be targeted at value for many (Eco Range), delightful performance (Pro Range) and design LED innovation (Neo Range). We have put state-of-art design and R&D centre at Gurugram to work on interactive products for smart homes.

Q What do you think will set Luminous Power Technologies apart from its competitors in the lighting sector?

A Luminous is an established name in home electrical business in India with robust distribution through 50,000 outlets selling all types of fans, wires and modular switches. With launch of LED lighting our portfolio is complete to cater all new home installations and renovations. Luminous is promoted by Sachin Tendulkar as our brand Icon and has confidence of millions of consumers. We also feel LED lighting which is combination of electronics, thermal, mechanical and optics is a form of digital solution which requires in-depth knowledge on all the aspects. We as champion of power backup solutions for homes and commercials have much deeper understanding of this technology.

Luminous plans to be a strong contender in consumer functional LED lighting with its in-depth consumer knowledge, nationwide distribution channel, in-house lighting competency, 360 degree process control and design LED innovation. ■

Jacques Cartier Bridge gets illuminated for Montreal's 375th anniversary

The bridge captures the pulse of Montreal life in real time. It also changes with the seasons using a 365-colour calendar. Day after day, the heart of the bridge gradually shifts from a lively spring green to a radiant summer orange, a rich fall red, and finally an icy winter blue...

The Jacques Cartier Bridge shone bright this 17th of May evening, with a stunning inaugural light show that dazzled a large audience. The show demonstrated the many possibilities open to the world's first connected bridge. The interactive lighting work, *Living Connections*, was developed by a team of local creators and engineers as part of the official program for Montreal's 375th anniversary and Canada's 150th. The bridge illumination gives Montreal a new world-class visual signature.

After the 30-minute show marking the official launch of *Living Connections*, the bridge began its regular daily programming, which the public will be able to enjoy every night for the next ten years.

With this initiative, the Jacques Cartier Bridge lights up and comes to life every evening. The credit goes to intelligent programming that adapts to the seasons and the city's energy. Activated by millions of human and natural connections, the bridge awakens at sunset and goes to sleep with the day's first light. This ambitious, innovative new luminous signature is a tribute to one of Montreal's architectural

icons. Because of the evolving, networked and interactive content, the bridge is transformed into a barometer of Montreal life and energy – a world first!

Gilbert Rozon, the Commissioner for Celebrations of Montreal's 375th anniversary, said, "We are incredibly proud to see this new symbol of Montreal! The illumination of the Jacques Cartier Bridge is one of the flagship projects for Montreal's 375th anniversary, and the bridge is sure to become one of the world's most photographed. Long live Montreal."

Denis Coderre, Mayor of Montreal, said, "Montreal was illuminated in spectacular fashion yesterday evening, thanks to the Jacques Cartier Bridge, which will now become an even more powerful symbol of our city's creativity and international stature. It is now a

singular gateway to our beautiful city, and an important legacy of this 375th anniversary of Montreal's founding. Long live Montreal."

Éric Fournier, Partner and Executive Producer at Moment Factory, which led the group of multimedia and lighting firms that created the project, said, "We are very proud of this project, the result of an exceptional collaboration among several Montreal companies and talented individuals. For the next ten years, *Living Connections* will undoubtedly be a remarkable icon and light signature for our city, and an unparalleled showcase for Montreal creativity and engineering."

Glen P. Carlin, CEO of The Jacques

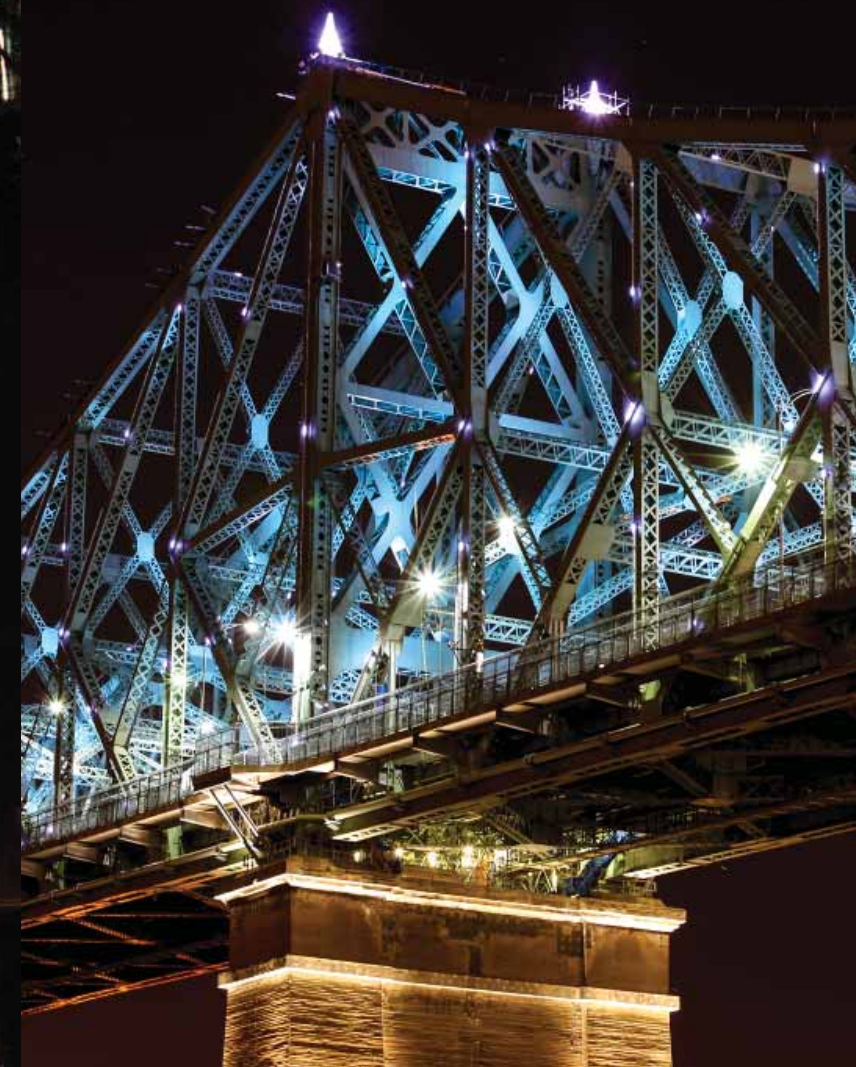
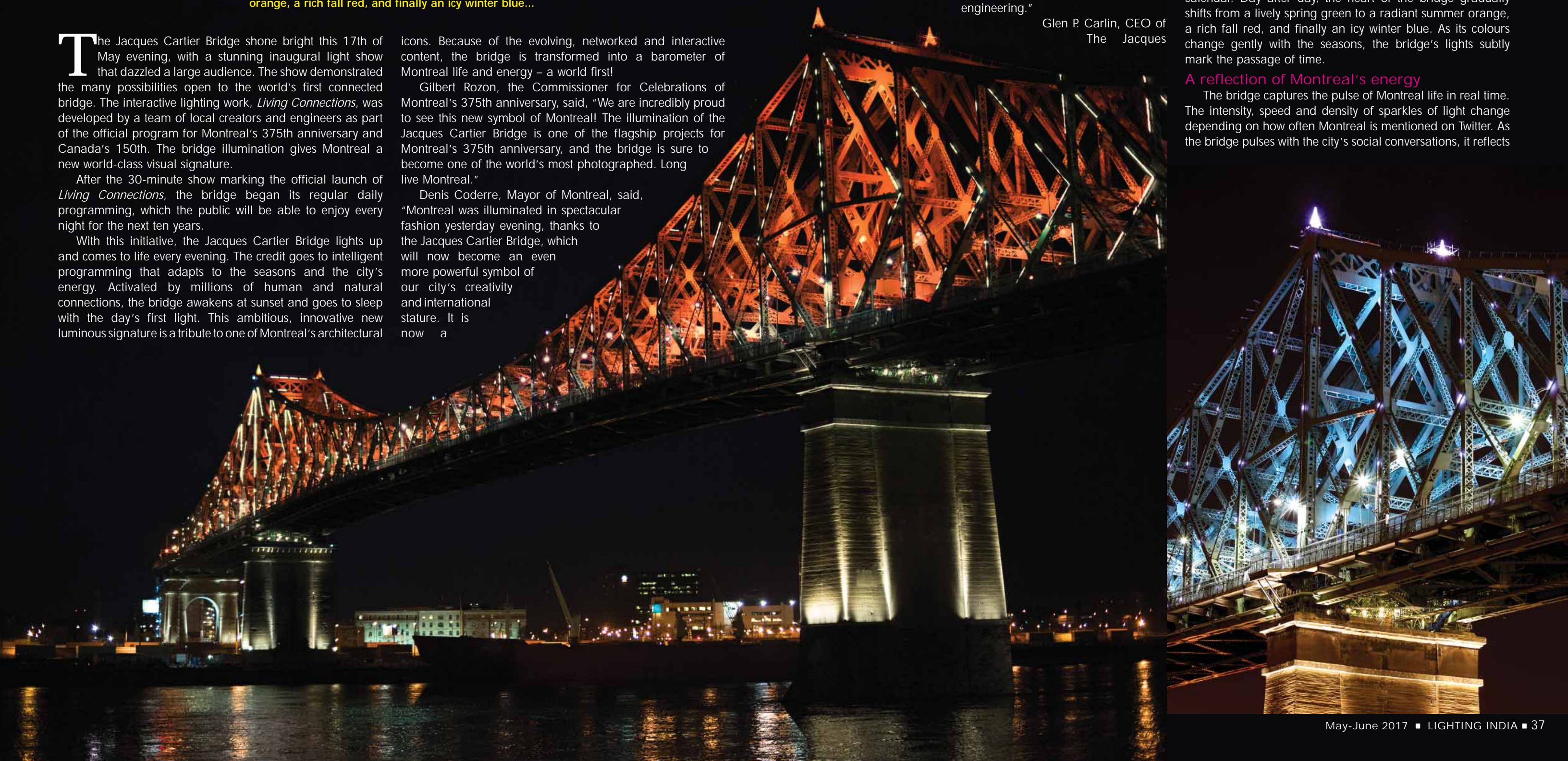
Cartier and Champlain Bridges Incorporated, said, "The illumination of the bridge is part of our vision for our structures. We want to make them more attractive and integrate them more fully with the city, making them emblematic structures for the community. Our Corporation is proud to have managed this major multidisciplinary project, which will be a beacon for Montreal and Canada for years to come."

As the seasons change, so do the lights

The bridge changes with the seasons using a 365-colour calendar. Day after day, the heart of the bridge gradually shifts from a lively spring green to a radiant summer orange, a rich fall red, and finally an icy winter blue. As its colours change gently with the seasons, the bridge's lights subtly mark the passage of time.

A reflection of Montreal's energy

The bridge captures the pulse of Montreal life in real time. The intensity, speed and density of sparkles of light change depending on how often Montreal is mentioned on Twitter. As the bridge pulses with the city's social conversations, it reflects



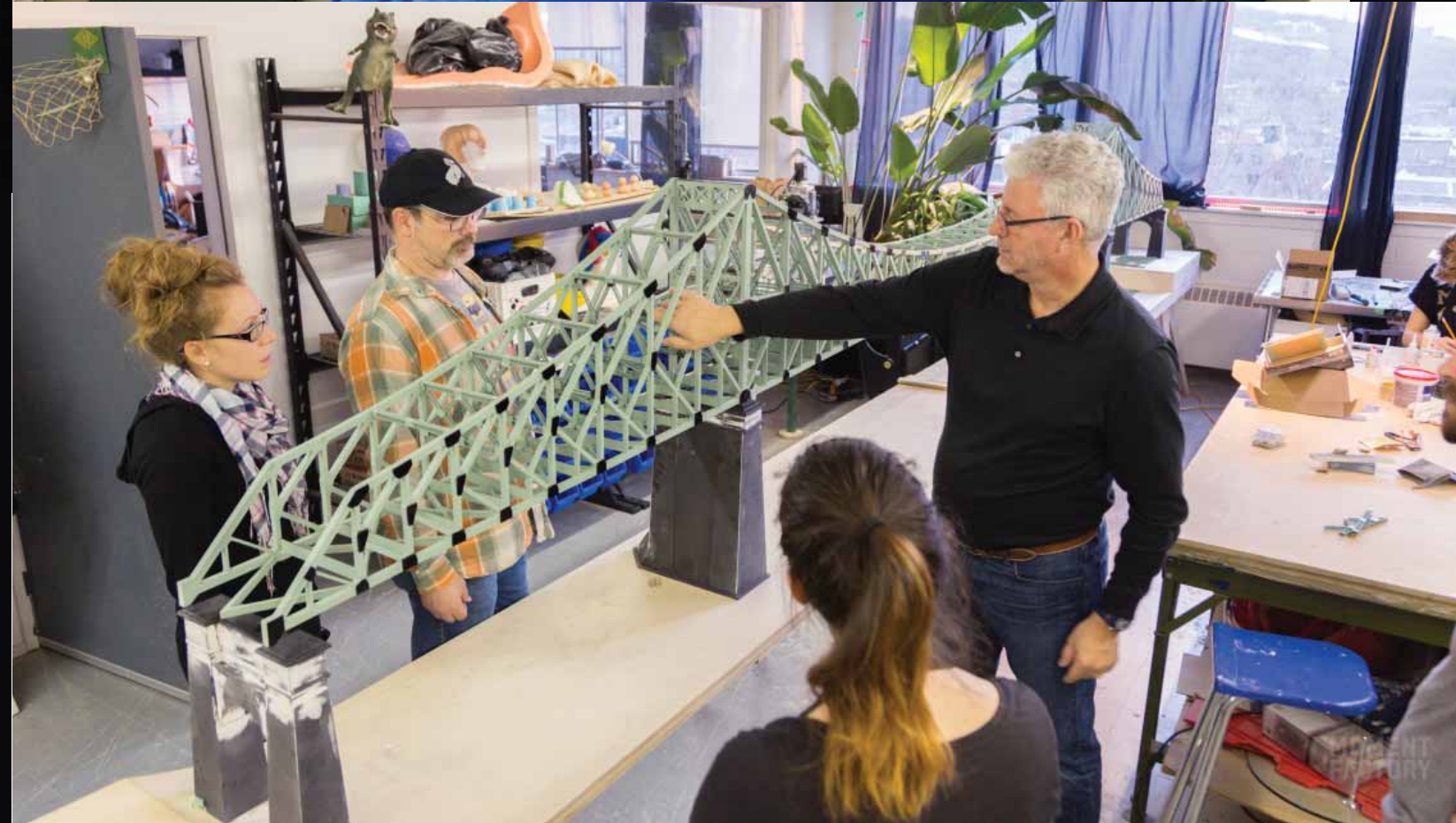
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Montreal's energy. Every new tweet sent with Montreal-related hashtags, including #IlluminationMtl, #375MTL, #Montréal, #Mtl and #Mtlmoments, is captured by the bridge's illumination system. The tweet is then transformed into a moving sparkle of light in the colour of the day. If the tweet is liked, the moving light expands. If it is retweeted, it accelerates. Otherwise, the moving glimmer of light disappears after a few moments.

Like clockwork

At first light, the bridge comes to life in a dance of lights, gradually revealing that day's colour. Every hour at night, a series of 5-minute animated lighting sequences visually translate Montreal's energy based on different types of daily data: the weather, traffic, news, major events, and more. The bridge is then taken over by luminous movement, coloured according to the hottest topic of the day in Montreal media: SOCIETY (red), ENVIRONMENT (green), TECHNOLOGY (light blue), BUSINESS (grey), SPORTS (blue), INSTITUTIONS (pink), CULTURE (purple).

At midnight, the bridge activates like an urban clock. It cycles through all 365 colours





on its calendar, looking for the colour of the day. At the end of the night, the bridge's framework goes dark. Only the turrets reaching high into the sky and the piers supporting the structure remain softly lit. Finally, at dawn, the bridge greets the city's early risers. It is subtly illuminated with lights mimicking the colour of the sky in real time.

Living Connections was produced as part of Canada's 150th anniversary and Montreal's 375th, with the financial participation of the government of Canada, the government of Quebec, the Ville de Montréal and the Great Montrealers.

The project is managed by The Jacques Cartier and Champlain Bridges Incorporated. Moment Factory is responsible for the concept, in collaboration with six Montreal-based lighting and multimedia studios: Ambiances Design Productions, ATOMIC3, Éclairage Public / Ombrages, Lucion Média, Réalisations and UDO Design. The engineers for the project are the WSP- AECOM consortium, and lighting systems were installed by Pomerleau. ■

Photo Credit : Moment Factory

Robe Funks it Up with Bruno Mars

The moving Spikie columns and pods provided a huge scope to change the appearance and ambience of the stage and are used constantly throughout the show, each time bringing a totally new perspective to the space, matching the diversity of the performance...

Seven hundred and ninety five (795) Robe Spikies are on the road with the incredible Bruno Mars 24K Magic world tour – setting a record for the largest number to date of a single type of Robe fixture on one touring show.

The Spikies are the main lighting feature of an action-packed show and are used constantly for hi-impact looks, an array of fluid effects, mesmeric chases, animated chunks of colour and magically twinkling and sparkling 'soft' surfaces which can totally transform the appearance of the performance space in this exciting hi-energy show.

The dynamic, colourful and highly visual production

design was originated by Leroy Bennett of Seven Design Works, who collaborated closely with a top creative team including lighting designer Cory Fitzgerald and lighting director on-the-road Whitney Hoversten.

24K Magic is also currently one of the most talked about live shows of the year by the multiple Grammy award winning artist, following the release of his hugely successful third studio album of the same name at the end of 2016.

The worldwide lighting contractor is VER who made the massive investment in Spikies which were delivered by Robe North America.



It is a big and beautifully balanced visual collage of lighting and video – with live (IMAG) video director Steve Fatone cutting the camera mix, combined with eye-catching playback content produced by Empirical Studios.

Bruno Mars himself was integrally involved with the evolution of the stage presentation, and he and his incredibly talented band also provide the final ingredient in this entertaining molten mix of intelligence, fun, wit- coupled with some awesome technology and imagineering.

Cory - who has worked with Bruno Mars since the 2011 'Hooligans in Wonderland' tour and enjoys a great working relationship and dialogue with him - and Roy's brief from the artist included references to a wide array of memorable shows.

These included the huge iconic PAR can rigs of the 1990s that graced the stages of legendary artists like Queen, Michael Jackson and AC/DC.





"Bruno wanted power to the lighting as well as a clean stage and the feeling of an environment or room .. in which he was playing" explained Roy, "which inspired the synthesis of Versace showroom vibes and these massive retro lighting rigs." So the show aesthetic is based on all these parameters plus the seating being sold to 270 degrees.

To recreate the wall of lights effect in a thoroughly contemporary context they needed a fixture with the right appearance that could also produce the diversity of effects required to keep the looks pumping throughout the hi-energy 2-hour show. The 16 action packed numbers embrace a plethora of musical styles and genres.

The fixture they sought needed to be lightweight enough to be practical on tour ... and with that many on the rig and a lengthy itinerary already confirmed, it needed to be robust and reliable.

Several shoot-outs and tests were conducted to 'audition' fixtures explained Cory, revealing that the "unified look of the beam in the lens was a huge part of the Spikies winning out." He also said that their speed was a big factor in addition to the 360-degree rotation, together with their multi-functionality and the flatness of the colour field. On top of that, effects like the prism and the flower "really make them unique in their class."

Roy added, "The Spikies were chosen for their versatility, speed and compact size ... I wanted to pack as many units as possible into the pods!"

Three hundred and seventy-five (375) Spikies are built into five upstage columns, and the other 420 are contained in 20 moving over-stage pods, all constructed by TAIT together with the automation systems to move them.

The five back columns are each loaded with a 5 wide and

15 fixtures high matrix of Spikies, and the reverse side of the column is covered in an RGB LED 'lightbox' paneling material for contrast. They rotate to reveal the different sides throughout the show.

A large LED video screen also flies in at certain points just downstage of the columns, and at times this is lit through with the banks of Spikies, producing another dimension to the stage.

The 20 Queenesque pods over the stage are rigged in a five-wide-four-deep configuration, each loaded with a 7 x 3 Spikie format utilising 21 fixtures per pod, and these move into a series of different looks throughout the set.

These moving Spikie columns and pods provide a huge scope to change the appearance and ambience of the stage and are used constantly throughout the show, each time bringing a totally new perspective to the space, matching the diversity of the performance.

For transportation, the Spikie pods and columns are de-rigged, have protective cover boards and wheels added and are rolled up the truck ramp – a swift, compact and straightforward exercise and a neat solution

in part facilitated by the light weight of the lights.

Some serious programming – on a grandMA2 full size - went into the equation. This was undertaken mainly by Cory assisted by Whitney and also Davey Martinez during the three weeks of production rehearsals at Rock Lititz Studio in Pennsylvania.

Cory commented that it's a testament to 'the fixture and its flexibility' that they can get a whole show simply by programming different looks and movements with uniform pods of lights.

Seven Robe BMFL Spot fixtures are utilised for key lighting all the performers onstage. A VER lighting crew of 6 is teching and rigging all the kit on the road, crew chiefed by Soline Velazquez. The tour's production manager is Joel Forman. ■

Photo Credit: **Louise Stickland**



Louise Stickland
Freelance Journalist
working with Loosplat
company, UK.



Lighting Science brings to life their HealthE series and expands line of biological lighting

The company's mission is to bring life-changing products in human health, agriculture, and infrastructure to market...

Lighting Science, a well known company in next-generation LED lighting solutions, has expanded its existing line of successful biological LED technology -to include new form factors for the commercial and contract market and presented it at the LIGHTFAIR 2017. The company's mission is to bring life-changing products in human health, agriculture, and infrastructure to market. Their extensive technology and intellectual property, including the company's nearly 400 LED lighting technology patents, has set them apart in the industry. Their proprietary product line includes the spectrum-focused HealthE series, the urban agriculture sensation VividGro, and FreeLED. They are dedicated to providing high-quality service and technological solutions its customers and channel partners have come to expect.

At the LIGHTFAIR 2017, their patented GoodDay technology, which amplifies productivity by mimicking the





physiological effects of sunlight, was displayed in multiple new form factors as will the GoodNight technology, which has been scientifically proven to allow higher melatonin release than conventional lighting, and increase restful sleep. Lighting Science, the first pure play LED company in the United States, has long understood the implications this technology can have in an educational, workplace or health care environment, and is currently working across these industries, generating data that they hope will change the lighting industry forever.

Ute Besenecker, Ph.D., Director of HealthETM Lighting and Senior Scientist at Lighting Science, said, "I have been observing a paradigm shift happening in lighting over the past 10 years. Now, after decades of research and development, industry leaders and even the general public recognise that carefully engineered LED lighting technology is the perfect, non- invasive and natural solution for wellness and preventative care. It is an exciting time to work in this field." ■



Fred Maxik
Founder & CTO
Lighting Science Group

How Smart Is Your Lighting Design

a look at how new smart technology is integrating into our daily life

It is time we start thinking smarter when it comes to lighting design. It is not only about adding smart features to lighting solutions and in the process making lighting designers less relevant. It is time to start thinking smart and differently as remember, there is no Planet B!

Introduction, what is smart?

Smart is a widely used term that seems to have different meanings to different people. According to the dictionary the adjective 'smart' refers to a ready mental ability to respond in a, clever, shrewd or sharp way when dealing with other people or in businesses. Smart can also refer to an impressive, neat appearance in a more sophisticated and fashionable sense.

The term 'smart systems' according to Wikipedia, refers to the incorporation of functions such as sensing, actuation and control that allow you to describe and analyse a situation, make decisions on the available data in a predictive or adaptive manner, thereby performing smart actions. In general the 'smartness' of a system is attributed to an autonomous operation that is based on closed loop control, energy efficiency and networking capabilities.

Cyborg's

I had the pleasure to meet Neil Harbisson during the PLDC in Rome (2015) and for those not aware, Neil is one of the first officially recognised Cyborgs on this planet. His cyborg status (and photo with his implanted sensor on his head) is officially listed in his passport. Neil is unable to see any colours except shades of white, grey and black. He understood early in his life that sounds and colours are related and over the years he developed a sensor that



converts colours into sounds (vibrations). The sensor is physically implanted on his skull and each colour that is sensed is then translated into vibrations that he feels. So he 'hears' colours. In Rome he told us he is able to discern more than 300 colours/ sounds! I guess we classify this as smart!

Smart lighting, the next big thing?

First there was just incandescent light, quite an invention at the time but not really something classified as smart, more an evolution of technology that was later followed by 'energy saving' lamps. The big word here is 'sustainable', which most of the time is wrongly being translated by advocating lighting as producing lesser watts per square meter. But lighting is not designed for lux or energy meters, it is designed for people to see, to enjoy or socialise! To prove my point, we can do zero watts per square meter but then we would have no light...

More recently light and lighting design was being (and still is in many cases) branded as 'human centric', if anything it is a smart sales slogan invented by the manufacturers to provide potential clients a new buying incentive. After all we are all humans, aren't we?





Photo: Coelux

But there are actually some smart functions advocated within the human centric approach one of them being tuneable light. Light that is being tuned to artificially reproduce the intensity and colours of natural daylight as it progresses during the day, from sunrise to dusk. It is said to have positive impact to our circadian rhythms, health and productivity, though to my understanding the jury is still out on the actual measurable effects.

Today long haul intercontinental flights, hospitals, offices and schools are applications where tuneable white light is being introduced.

Artificial daylight

One of the smartest tuneable day lighting systems available today has to be from Coelux. An artificial lighting

system that is capable of reproducing sun/day light for any longitude or latitude coordinate in the world. I have personally experienced it and the (visual) effect is amazing.

The healing power of lighting

We all know that lighting is built up from red, blue and green light, mixed together it produces white light. Maybe lesser known is the fact that specific colours are related to different parts of our body and that specific colours have different 'healing' effects on our moods and performance. Though there are still debates ongoing about the exact effects and impacts, many have already jumped on this human aspect of lighting by introducing 'smart' colour changing features to their lighting systems. Warm amber, blue and purple seems to be popular colours to help passengers on long haul flight cope with jetlag and fatigue, introducing a variety of these colours for different activities (welcome, take-off/landing, meals, relax, sleep, etc.). One airline (Iceland Air) even goes as far as reproducing the Northern Lights also known as the Aroua Borealis.

In one of our projects we recently introduced this concept for a hotel guestroom.

Getting smart

Today's lighting market is cut throat and crowded with LED Cowboys roaming the markets to sell whatever LED's they can sell, unscrupulously. It's all about money and profits and one sales pitch is bettering the other. Smart features are now the latest trend; smart sensors, smart apps, smart watches, even IKEA has joined the fray offering smart lighting controls for the home.

Perhaps it is good to remind ourselves where we came from. Controlling the old incandescent lamp was simple, just switch. But the lighting technology developed and we have has now arrived in the world of LED lighting, a complex world of hardware, electronics, software and digital controls. A



Photo Credit: Martin Klaasen, KLD



want to create and if there are possible architectural limitations and we liaise with the electrical specialists for the electrical infra-structure to make sure it is all safely and securely designed. Finally we do our checks and make sure the selected control technology is compatible and all relevant or required smart functions are integrated. The end result should be economically feasible in terms of capital and operational costs and result in a sustainable and energy saving lighting control solution.

Reliability and durability

The reliability and working of a (smart) LED lighting system is not just a switch and a light...it is a complex myriad of components and software (!) and is therefore as good as its weakest link. These are just a few:

- Quality of the LED light source

lighting designer no longer has to deal with just lighting design, mastering (or at least understanding) control and content design are fast becoming equally important!

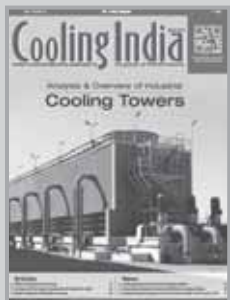
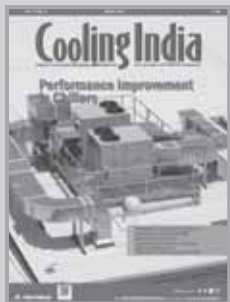
Lighting controls

How do we arrive at a good and relevant design for lighting controls? We first look at the space planning and the human interaction in that space and check that off against the lighting applications required and how much natural or artificial lighting will be involved. We then look the effects we

- Installation quality (hard/software)
- Workmanship
- Connections
- Power supply quality
- Compatibility of components
- Controls and dimming technology and protocols
- Protection (electrical, safety, surge, etc.)
- Electrical compliance

Paris metro LiFi station by (Oledcomm)





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- Paramedical Professionals
- Hospital Administrators
- Pathologists
- Radiologists
- Physiotherapists

Several Others...



Image credit: Martin Klaasen, KLD

We all have been confronted to some horror stories in the course of our projects, here are some of mine:

The evolution over time

Over time we have gone from a simple wall switch app based lighting controls, with pre-programmed scenes sets, which we can personalise to our preferences. Physically visible switches are going invisible. At the same time we have gone from a wired world to a wireless world. Traditional lighting control companies like Lutron, Dynalite, Helvar, Crestron and others have seen new entrants in the market from a non-lighting traditional background such as Google, Apple and Googee. Somewhere in between we have companies like Casambi for interiors or ES Systems (Esave) for exteriors, who are specialising in wireless network system controls.

LiFi

In this context we also have to mention the development of LiFi (Light Fidelity), a lighting based WiFi system that uses

light rather than radio frequency for the use of data transfer. It is said to be much cheaper than WiFi and many times faster (Terra bytes instead of Giga bytes!). The range of the light spectrum is also many times broader than the radio frequency spectrum. The obvious draw back at this stage is that it needs the lighting to be operational to work, which in daytime situations or in interiors with lights switched off is a problem.

Interiors

Smart lighting systems in interiors involve functions such as auto-adjusting lighting levels to complement ambient daylight or presence detection. In other words lights only where we need it. This is a bit more complicated than said, as we still need some basic ambient lighting for a space if not just for providing spatial recognition and providing a feeling of safety and comfort, it is not just about having lighting where you are. There is a human need to identify where you are and orientate yourself.

In more sophisticated smart systems we find integration of all kinds of sensors, GPS and LiFi that are linked to apps allowing direct and dynamic interaction with the occupants of the space providing site/ product information, helping with way finding or guide in case of emergencies. But the system also offers monitoring options about the performance of the lighting system or feedback on system failures with the opportunity to act and adjust quickly. Pilot projects are under way in several retail / department stores around the world as well as some underground metro stations like in Paris.

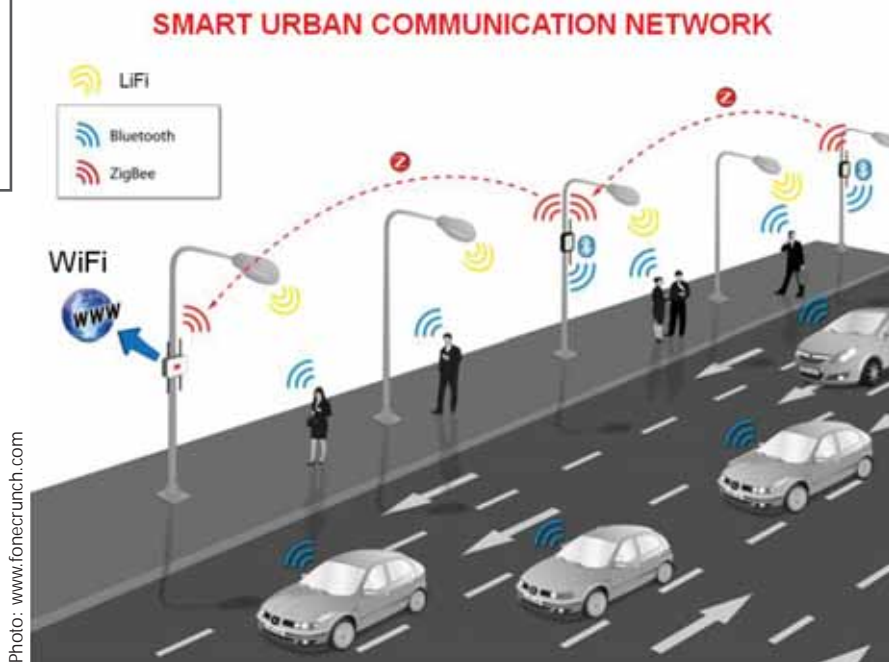
Exteriors

In exteriors we see the application of smart wireless systems in many cities around the world who have adopted a 'smart city' approach. We find particularly the big manufacturers heavily involved by offering 'free' test installations on stretches of roads to wet the appetite. Though many of these installations seem to be 'politically motivated' and not necessarily cost efficient at first they appeal to the general public. But there are definitely lots of merits to smart city lighting, specifically the development of smart poles that integrate many more functions than lighting alone.

Lighting functions may include street, pedestrian and façade lighting. Signage, wayfinding and promotional banners may be in the form of digital displays, internally lit signs or externally lit banners. Non-lighting functions can be much more extended; Wifi transponder, CCTV camera's, speaker functions, emergency call station but also



Retail project by CSR/SK Telecoms - UK



revolutionise the world of outdoor lighting. Many pole concepts with integrated solar panels have been explored with mixed results so far.

Smart functions as a design and management tool.

Xicato recently launched a pilot project in the Van Gogh Museum in Holland using their latest Intelligent Module Generation 4 Module. While able to provide smart features such as wayfinding, indoor location information and background information on the paintings that one is looking at through their bluetooth help app, the smart module has also features that are helpful to lighting designers and operational management.

The design features consist of the ability to tune the light colour to optimally fit the painting that is being illuminated, has options for dynamic light intensity adaptation depending on the ambient light situation or presence detection, as well as having options to regulate exposure time and light dosage,

typical criteria relevant to long term conservation management. This allows the lighting designer to plan, tune, adjust and program these options as part of the overall lighting design.

From a monitoring point of view there is a realtime feedback of the lighting intensities in use, as well as power consumption, voltage fluctuations, temperature variations over time. It also provide valuable information about the actual operating hours and signal strengths.

Time for something totally different

While all these smart features may have a very positive impact on the world we live in, there is one thing that needs

charge points for cars, bikes or mobile phones.

Linked to a **smart grid**, these poles may have photo-cells, light or proximity sensors to regulate lighting levels (dimming) or provide on-demand lighting. Proximity sensors within a wireless network may regulate lighting when cars or pedestrians are approaching.

At the same time the smart features provide real time tracking of energy consumption, lighting failure monitoring and may also be used to monitor traffic flow.

Solar energy

If we further expand the opportunities by including solar power to the poles it is easy to see how this can potentially

Source: Philips Lighting



a totally different approach...how can we be smart with the limited resources of our planet!

Today's lighting market model is based on a waste economy:

- Products are developed and sold as a solution to a problem
- Products are designed to fail with only a limited warranty
- Manufacturers (and suppliers) are profit driven
- As a result we are confronted with poor quality issues
- The end-user bears all the responsibilities (and the costs!)

In the end the products are discarded after useful life (waste disposal)

Light as a Service

The answer lies in a totally new approach called 'Light as a Service', sometimes also referred to as 'Pay per Lux'. Service driven models are already well known to the general public, just think of the Ricoh or Canon copy machines in your office, Uber taxi's, Air BnB and air travel in general. In all these cases you don't own the product, you use the product as a service and you pay a service fee for the usage. This concept has already found its way to fridges and even jeans, where you pay a monthly fee for using a pair of jeans which you can return within a year or exchange for a new pair of pants.

Light as a service is being pioneered today in a few pilot projects in Holland by a consortium that includes Philips. The characteristics of this model are:

- Pay per use instead of paying for possession
- The lighting installations are state of the art with smart and dynamic LED lighting
- The lighting is human centric

- The materials remain in possession of the manufacturer
- The lighting installation is a turn-key solution which includes installation, maintenance and upkeep
- The manufacturer is responsible for repair, re-use, refurbishment and recycling
- The manufacturer may also pay the electricity bill
- The arrangement is for a pre-determined contract period

The two pilot projects in Holland are an office building and a recently renovated part of Amsterdam Schiphol Airport.

The circular economy

Moving from a waste economy to what is called a circular economy is a win-win situation for everyone. In this market economy model we have:

- Lighting is a service, not product driven
- Assured performances with minimum failures
- Re-usable products with minimum waste
- Minimise the environmental impact with a reduced carbon footprint
- A one stop solution (ownership) with minimal capital outlay for the end user
- The latest technology that stimulates innovation ■



Martin Klaasen

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Shenzhen Yanshuoda Technology focuses on growth

Shenzhen Yanshuoda Technology Co., Ltd. is a technology company specialising in LED power research, development, produce, sale and service. The main products are LED waterproof power supplies and LED drivers. Thanks to the benefit of location and senior professional technical team, they have developed steadily and rapidly, as one of the top manufacturers in this line. Now, they have produced a series of popular and useful items after a good connection with marketing and uninterrupted testing.



They always try the best to the LED line, with independent intellectual property rights. With excellent structure, high performance and competitive price



(high power factor and synchronous rectifier), our products meet the real desire of the final customers. Finally, almost all items have got CE, FCC, RoHS, CCC, SAA, GS, CB and ETL approvals.

By virtue of tireless pursuit of the dream of the business combination with products, technology, talent, innovation and development, they focus on implementing of the embodiment of green, energy-saving and efficient development in future technology products for the global lighting energy waves. ■

Peeping into SAP's Unique Chic New 'Cafe'

The Cafe interiors aim to provide a warm, natural, chic, industrial look whilst trying to maximise interaction, collaboration and flexibility. The design features lots of different materials. High textured wood, Metal, Handmade tiles, Nylon ropes. Exposed concrete, Natural brick, Italian marble, Feature Lighting, Floor to ceiling glazing connects the indoors with the lush outdoors. Daylight streams into the cafeteria and lights up the interiors...



cafe is a warm place to eat, work and meet.

Lighting Arrangements

The basic strategy opted by the designers is to provide pools of light across the cafeteria. Also keeping in mind to highlight the eating tables and have ambient light fixtures lit the corridors. All bulbs are 3000K LED to give a warm look.

The project has feature lighting using six types of lighting arrangements.

- Four seater tables have hanging wire mesh fixtures.
- Six seaters have LED filament bulbs (like Edison bulbs) – again hanging from the ceiling.
- The long benches have a long light fixture made from ceiling mounted LED long body cylinders.
- Counter seating have wall mounted lamps.
- Infill lights are hung from ceiling by suspenders to adjust location as per AC ducts and services.
- Ceiling suspended fabric lights has been used to highlight food at bain maries and buffet counters.

Source

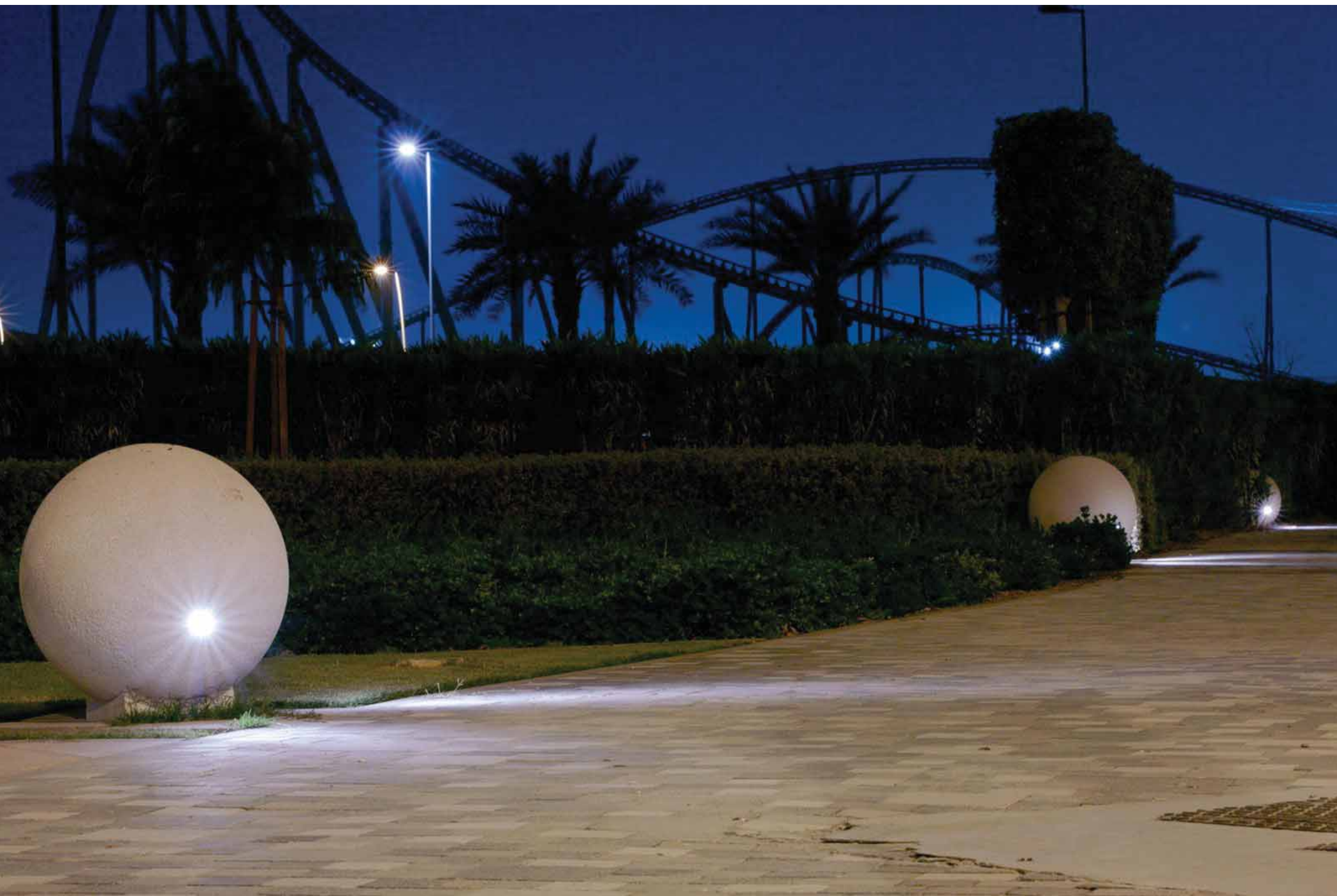
www.blueleavesdesign.co.in



Role of LED's in Landscape Lighting

Landscape Lighting is the use of outdoor lights to illuminate façade, garden, trees and water bodies of an area. A nicely lit landscape is very essential for the enhancement of security, beautification, entertainment and recreation of an area. Being a unidirectional source of Light LED's play a very important role in landscape lighting ...

A wide choice of colour temperatures and High CRI (Colour rendering index) make LEDs an ideal choice for landscape Lighting. A wide choice of colour temperature allows the designer to play with the colour of light and bring out the real texture of the landscape and the façade, whereas a High CRI provides sharpness to the Landscape. The choice of colour temperature (i.e. the shades of white coloured light) is the most narrower in LEDS and only with LED Lighting one can achieve a CRI of as high as 97.



Modern day advancements in optics and plastic technology and their integration with LED's have resulted in a perfect combination of opto-electronics. Another aspect of LED's that scores above the conventional sources of light is that LEDs are more rugged in nature and non filament source of light i.e. LEDs do not use any filaments and are less fragile in nature as compared to conventional source, so potting a waterproofing agent. Like epoxy or silicon on the Light source is very easy and comparatively safer if compared to the conventional sources.

The small size of the light source, in case of the LED makes it very easy to make efficient luminaries' in a compact size and for example making a linear wall washer for façade lighting or a

fountain light to cover the fountain is only possible if the source of light is small and discrete and can be connected in a parallel fashion.

Low voltage operation – The operating voltage of the LED is below 4v DC unlike any other form of lighting and to run it on 220v we generally make use of a SMPS (Switching mode power supply) to bring down the voltage and convert AC Current to DC Current and in case of any form of outdoor lighting especially any light that is in direct contact to water it is always advisable to run it on a lower voltage direct current to avoid any fatalities in case of current leakage, in case of conventional sources we have to make use of special inverter circuits to step up the voltage and convert it to



alternating current. This increases the cost of the luminaries', reduces the safety and cuts down life of the fixture .On the other hand, LEDs are a much safer alternative that runs on a low voltage (by its property) and are very safe in its operation .

Low maintenance –The life of the light source in a garden light is very important owing to the basic fact that the location of a garden light , generally speaking is in tricky areas let's say for example an underwater fountain light or an underwater burial installed in a swimming pool is very difficult to replace because it will need the entire pool to be emptied in order for it to be replaced or let's say for instance a wall washer / flood light installed to highlight the façade of a building at a height of 60 feet would require a crane to replace the light in most cases the cost of replacing the light is higher than the light itself .

Longevity is a basic criteria for



choosing the kind of Light in case of a Landscape Light and the LED Light Scores above the other sources of lights on this parameter.

Better and brighter light – The key function of landscape lighting is security and beautification of an area. LED's being the brightest form of light achieving tremendous efficiency of 170-180 lumens per watt delivers safe light like no other source. Another feature of LED Light that scores above conventional sources like metal halides and halogens is that LED Lights are not prone to any burn outs or blasts at the light source- due to short circuits or overheating conditions at maximum the LED Light fuses in case of any unfortunate incidents.

The CRI of LED lights is again highest known among the various sources be it halogen /metal halides / fluorescent sources and owing to its very small size it can be very easily integrated with secondary lenses and optical reflectors ,so the quality of light obtained from led's is also the highest comparatively. Aesthetically speaking by using LED Lights the result generated will be the best.

Environment Friendly – LED's are mercury free and do not emit any UV or IR radiations and are ROHS compliant i.e. they are rid of any harmful substances like mercury, cadmium etc. Unlike the other sources of light like metal halides that emit UV and have a high cadmium content or fluorescent lights that have a lot of mercury or halogen lights that generate a lot of IR radiations contribute a lot in polluting the environment and global warming. Since landscape lights are installed near the trees / in water and are close to nature this gives all the more reason of choosing LED lights over conventional sources. ■



Ankit Bajaj
Managing Partner
Noble Electrical

Lights turned down after a successful three-day of business at LED Expo Mumbai

Visitors were treated to a dazzling display of the latest technologies and LED product innovations, while the one-day summit ensured hundreds of industry professionals were privy to the latest insights on technology, business development and regulatory fronts.



Everyone was impressed with India's largest exhibition on LED lighting products and technology's business dynamism. The diverse product portfolio by 215 exhibitors (signifying a 31% growth as compared to 160 exhibitors in 2016), and growing international participation together with the concurrent LED Summit attracted 9,100 business visitors over the three days. Exemplifying the trade success of the platform, over 30% exhibitors re-booked for the next edition in Delhi.

Tejas Lomate, Director, S M Solar Ltd, said, "Our display of products such as solar street lights without batteries, industrial lights of 500 and 1000 watt were new to the Indian market and have received a very good response at LED Expo. We are meeting quality visitors who have placed orders with us. We have closed deals worth 15-20 lacs already during the course of three days and are excited to be back for the Delhi edition."

Another exhibitor, Gagan Bhansali, CEO, Innovo Lites, said, "The best part of exhibiting at this show was, that it is a purely b2b show focusing on LEDs and we are assured that we are interacting with genuine buyers from the industry who are interested in business."

Visitors were treated to a dazzling display of the latest technologies and LED product innovations, while the one-day summit ensured hundreds of industry professionals were privy to the latest insights on technology, business development and regulatory fronts.

One such visitor at the fair was, Sachin Tandon, Senior Manager Construction, Tata Projects Ltd, said, "Relevant





trends and new concepts are being discussed on this forum, one such being the driverless LEDs, and I had a chance to directly interact with the speaker to discuss this at length. We are working on the Pune smart street lighting project where we are looking at replacing 100,000 lights. Out of these, 25,000 have already been replaced and we are looking at new solutions for further implementations. This has proved to be a useful platform to source products as well as gain insights."

Important announcements were made by noted panelists at the fair including S K Marwah, Director, Ministry of Electronics and Information Technology (MeitY), who while discussing about National Policy on Electronics, NPE 2012, said, "Domestic LED manufacturers will get 50% preference for government procurement projects. 200 manufactures of various sizes are also adding to the growth of the industry in India. We are also working towards target Net ZERO imports by 2020 for the electronics sector and attract investments on USD 100 billion by 2020. The purpose of being there was to inform the industry about these initiatives."

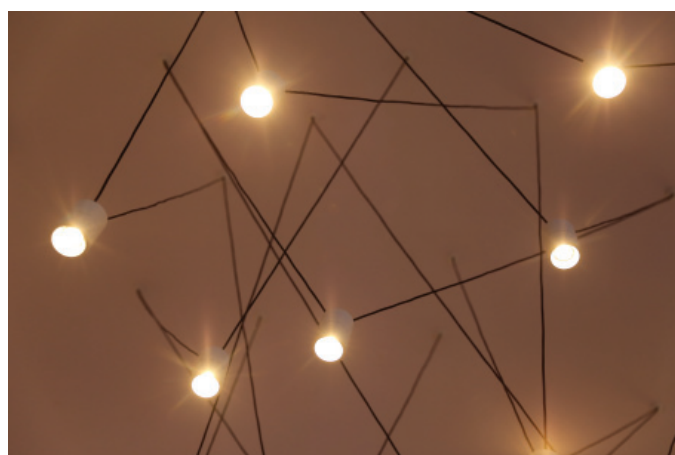
Another prominent speaker, D Christopher, General Manager, Electric Lamp & Component Manufacturers Association (ELCOMA), said, "Smart India has enough lighting opportunities for all stakeholders. By the year 2020,



the lighting business will be 26,000 crores out of which 23,000 crores will be LED alone. We envision to reduce lighting power consumption from 18% to 13% by the year 2020 by changing existing domestic lights sockets and street lights with LED, while sharing about Vision 2020 – Roadmap for ELCOMA. "

Affirming that this was a key event for sector players to track industry advancements, Bhavesh Mehta, Deputy General Manager, Reliance Retail Ltd, said, "We have been following the LED industry very closely and to keep up to date about the latest trends in the Indian market. At Reliance Retail, we are mainly interested in the end products and source these from exhibitors at the fair directly. The show has grown as compared to the last edition and the diverse products have added much more value to the show."

Also visiting the fair was Himanshu Dalvi, Consultant, Cosmo Ferrites Ltd, said, "I have been associated with Light India and LED Expo since many years and have found that these fairs provide a platform to meet serious buyers for actual transactions to be taken place. It is a win-win situation for exhibiting companies because there is always a return on investments made. I strongly feel that the event should also be taken to the south as well." ■



Palm 2017 turns out to be largest expo in its 17th consecutive year

Palm content creates pride and position for professionals establishing credible, reputed platforms with awards, conferences, championships...



Palm 2017 got off to a roaring start with long queues for the registration before opening hour at 11am. Total visitors on day 1 clocked 7,682 and nearly 2000 participants, representing the exhibitors. It was thumbs up across the exhibit floors from all exhibitors signalling a very high quality crowd - knowledgeable and representing prospects.

This was the largest Palm expo in its 17th consecutive year, growing consistently year on year at more than 10 to 15 per cent. The expo covered in all 27,000 sqm across the demo cubes, line arrays, live arena, conference halls and exhibit area. Exhibits were divided into the sound and display hall and the lighting hall.

The biggest Palm show hosted nearly 225 exhibitors over 9,500 sqm of exhibit area. Witnessing the maximum number of new products this year, day 2 clocked 7,440 unique

visitors, with a record 10,186 footfalls. Over the three days of the show, total unique visitors registered were 21,506, an increase of 17.5% from 2016. The show

hosted a total footfall of 27,191 visitors across three days.

Manish Gandhi, Director & COO of ABEC Exhibitions & Conferences Pvt. Ltd., said, "Palm 2017 welcomed 225 exhibitors across five halls and two demo grounds. This large expo replete with the latest technology from leading brands exhibited latest products from across the world. ABEC is proud to serve the pro sound & light industry in this remarkable expo which saw a total footfall of over 27,191 this year and which we shall build bigger and better in 2018."

Stage sound & lighting indeed was the biggest chunk of the visitor pie. Remarkably system integrators looking for solutions across AV, Audio -for-Video, cinema represents the second highest piece of the pie. Studio recording and music production solutions represented the third biggest piece of the pie. The visitors mix for each segment was a healthy average between professional talent and business buyers.

Gordon Payne, Asia Regional Director, ITE Asia Exhibitions Limited, said, "ITE takes pride in ownership of this dynamic platform, infusing energy to the event entertainment industry in India. ITE is committed to develop content to drive professional growth in India's changed stage Sound & light market. The show's success can only be attributed to the enthusiastic attendance of 21,506 unique trade professionals. ITE is happy to serve this dynamic community."

Anil Chopra, Founder of Palm Expo, said, "Palm over the years has been curated nurturing engagement equally from the trade as well from the engineering talent. The philosophy of Palm has always been to develop the ever hungry and eager man power in India, as much as to build a distribution for quality sound and light. This year the Palm conference hosted some of the leading talent globally. The IRAA is the largest gathering of sound engineers. The excitement of professional committee at Palm is contagious and this is one the reasons, why unlike any other show in the world, the Palm show has an air of enthusiasm in the isle. It is not just a trade show; it's a celebration of sound and light technology."

ABEC successfully produced this 17th edition of the Palm expo. They met the challenge to provide an international class show production featuring championships, demos, creative showcase conferences, stage arenas and sound reinforcement. ABEC deployed resources and experience in conducting such an expansive expo covering 27,000 sqm. All the events at the expo were held smoothly with appreciative audiences from trade and creative professionals. ■



Chelsom introduces an innovative wall light



LED Dock Combination by Chelsom is a slender hotel guest room or ship cabin wall light. Ideal for the bedside with main room illumination from within the fabric shade.

A warm white LED reading light is housed within a cylindrical head that swivels 90 degrees and 'docks' into a semi recessed backplate. The innovative wall light also features a USB charging port which remains powered even when the lights are switched off.

LED Dock Combination is available in two standard finishes including Polished Chrome and an industrially inspired Black Bronze finish. ■

Website: www.chelsom.co.uk

Cree proclaims the Next Generation of Extreme High Power LEDs

Cree introduces the XLamp XHP50.2 LED, which delivers up to seven percent more lumens and 10 % higher Lumens-Per-Watt (LPW) than the first generation XHP50 LED in the same 5.0 mm x 5.0 mm package. The new XHP50.2 LED enables lighting manufacturers to quickly improve the performance of existing XHP50 lighting designs. Capable of producing more than 2,500 lumens from its 6mm Light Emitting Surface (LES), the XHP50.2 can reduce the size and cost of new designs and enable innovative solutions to address applications ranging from spot to street lighting.

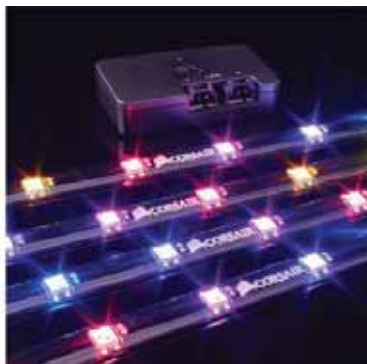
In addition to light output and efficacy enhancements, the XHP50.2 LED provides improvements to optical uniformity through secondary optics, enabling spot and portable lighting manufacturers to deliver better lighting experiences. The XHP50.2 LED has LM-80 data available immediately, reducing the time required to receive ENERGY STAR and DesignLights Consortium qualifications.

Featuring Cree's EasyWhite technology, which provides the industry's best colour consistency, the XLamp XHP50.2 LEDs are available in 2700K-6500K with high CRI options. Product samples are available now, and production quantities are available with standard lead times. ■

Website: www.cree.com



Corsair unveils a New Range of CORSAIR LINK Fan and Lighting Controllers



Corsair, a well known company in enthusiast memory, high-performance gaming hardware and PC components unveiled the Commander PRO and Lighting Node PRO fan and lighting controllers, alongside the new HD140 RGB series of RGB cooling fans.

Controlled by CORSAIR LINK software, Commander PRO is the ultimate in system control, providing complete command of up to six 4-pin PWM fans, two RGB lighting channels, four temperature sensors and two USB 2.0 headers.

Lighting Node PRO lights up your PC like never before, with two CORSAIR LINK controlled RGB lighting channels and four included individually addressable

RGB LED light strips, each equipped with ten RGB LEDs for brilliant, customisable, system illumination.

Finally, HD140 RGB joins the award-winning range of CORSAIR RGB cooling fans. Each 140mm fan boasts twelve vibrant, individually addressable LEDs, software controllable in CORSAIR LINK using either Commander PRO or Lighting Node PRO.

Providing total control of your PC's cooling and lighting, Commander PRO, Lighting Node PRO and HD140 RGB combine with CORSAIR LINK to put one in command. ■

Website: www.corsair.com

Fulham introduces New DALI Lighting Control

At Lightfair International 2017, Fulham Co., a well known supplier of lighting components and electronics for commercial and specialty applications, displayed its new family of WorkHorse LED Extreme constant current, programmable drivers specifically designed for outdoor and high-power applications, including new support for Digital Addressable Lighting Interface (DALI) lighting controls. The new WorkHorse LED Extreme Drivers with DALI are the first Fulham products to be introduced following the acquisition of Control Network Solutions (CNS), the UK-based creator of the elitedali smart lighting control and management system. With the addition of support for the DALI lighting communications standard, the WorkHorse LED Extreme drivers now support remote commissioning and control as well as intelligence and programmability. The WorkHorse LED Extreme is an IP65 compliant driver designed specifically to operate in harsh environments such as outdoor parking lots, for street lighting, and outdoor commercial lighting. Adding DALI support provides centralised control of dimming and other lighting characteristics.

The WorkHorse LED Extreme Drivers with DALI have the widest output current/voltage range available in the market, programmable in 1mA increments. The output current and dimming PAGE 2 OF 3 curve are fully programmable using Fulham's SmartSet software, with expanded dimming capability using the DALI dimming protocol.

The WorkHorse LED Extreme Drivers with DALI are available in linear and compact form factors. The units support universal input voltage from 120V to 277V, 50-60Hz. Products support universal voltage input, for operation around the world. The WorkHorse LED Extreme drivers also have 6kV of internal surge protection and come with a five-year warranty. ■



Website: www.fulham.com

Larson Electronics releases a new explosion proof low bay AC LED Light

Larson Electronics LLC, a well known industrial lighting company, unveils a new explosion proof low bay AC LED light to be added to its catalogue of products this week. This heavy-duty explosion proof LED features no driver, long lamp life and provides bright illumination with broad coverage in hazardous locations.

This explosion proof low bay AC LED light features state of the art AC LEDs paired with specially designed heat sinks for improved efficiency, thermal management, and durability. By eliminating the drivers associated with DC LEDs, space is freed up for more connective surface, accelerating heat dissipation and increasing durability. The specially designed heat sink allows for greater surface area contact with the air as well as a stronger airflow rate. This low bay LED has been created for maximum thermal efficiency, making it ideal for applications in which the ambient operating temperature falls into extreme ranges, especially high heat applications. In addition, fewer sub-components also means fewer chances for secondary component failure. The simplified circuit system used within AC LEDs creates greater stability and enhances luminaire lifespan.



The IP68 rated construction of this LED light enables it to withstand the daily wear and tear inflicted by harsh outdoor conditions, as well as, the corrosive effects of saltwater spray in marine environments, including saltwater spray. The copper-free, non-sparking die-cast aluminium alloy housing and tempered glass lens are vibration and impact resistant, making it ideal for applications such as: oil refineries, petrochemical plants, painting facilities, offshore rigs, marinas, docks, warehouses, garages and commercial buildings. This AC LED light is listed for use in the United States and Canada and carries IEC Ex and ATEX certifications. ■

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ZyLight includes Rayzr 7 - the new series of seven-inch LED Fresnels

ZyLight, a well known manufacturer and distributor of innovative LED lighting solutions, revealed that it is the distributor of Rayzr 7 – the new series of seven-inch LED Fresnels. Rayzr 7 is the latest in a select group of broadcast, film, and stage lighting manufacturers that ZyLight distributes across North and South America.

The Rayzr 7 series includes four different models, the 300 (300W) and 200 (200W) daylight and 300B (150W tungsten or daylight) and 200BM (100W tungsten or daylight) bi-color models. Compact and lightweight, all Rayzr 7 lights offer spot/flood focus, integrated DMX control, AC/DC power options, and approximately 50,000 hours of runtime.

Last spring, ZyLight established its first distribution agreement with Aladdin, which offers its BI-FLEX flexible LCD panels and ultraportable lights. Since then, the company has added LDDE theatrical and rear projection lighting instruments, NanGuang's compact LED Fresnels and soft panel lights, and FXLION's battery and power systems exclusively throughout North and South America. ■

Website: www.zyLight.com



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Dimmable | 2 individual channels Adjustable functions and currents



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