INDIA'S FOREMOST MAGAZINE ON THE LIGHTING INDUSTRY

Lighting India

Vol. 12 No. 5

September-October 2017

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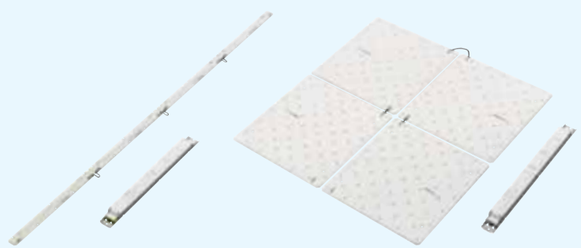

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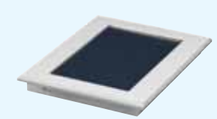

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PUBLISHER'S LETTER

Hello and welcome once again to *Lighting India*, the oldest and exclusive magazine on the lighting industry in India. Like every year, this year too, your magazine was invited as media partner to cover the Hong Kong International Lighting exhibition – Autumn edition. Again, like every year, this year too I had the opportunity to be at the fair and I must say the fair is growing by the year with more than 2700 record breaking exhibitors participating at the fair. Top notch brands from around the globe displayed their latest products and developments to the buyers. What was, however, a disheartening thing was the abysmally-low presence of Indian participants.

A country with nearly a quarter and billion people had only seven companies participating, who put-together had taken not more than 60 sq mt of space in the gigantic exhibition, which confirmed its status as an ideal platform for global lighting players – both buyers and exhibitors – to exchange, meet and do business.

There was a stark increase in the number of companies that were displaying more smart lighting products. After all, Internet of Things (IoT) is set to be the future. Also the exhibitors have since last year started a simultaneous exhibition on Outdoor and Tech Light Expo some 50 kms away from the main exhibition fair ground. I had the opportunity to visit the inaugural fair last autumn as well. The fair which primarily showcased outdoor lighting, advertising and industrial had over 410 participants and some of the products that were displayed included new lighting solutions and systems.

The exhibition also gives me an opportunity to meet eminent lighting professionals. Lighting genius Emeritus Professor Warren Julian gave an excellent and interesting presentation on what light is all about. He stressed the importance of contrast in lighting system and the three essential elements of human centric lighting – enhancing human vision, well-being and performance. Prof. Julian also explained how good lighting can produce a feeling of well-being by reducing unwanted effects like glare. I must say, I consider myself lucky that I could meet him at this place every year. After all, Lighting India had the honor of having the first article by him in the inaugural issue way back in 2003.

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

Mahadevan

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Photo Courtesy: Jaquar Lighting

Jaquar Lighting is one of the fastest growing lighting companies. It not only offers solutions for residential and commercial, but also for outdoor applications. Ranbir Mehra, Director, Jaquar Lighting speaks to Lighting India about the industry and Jaquar lighting taking forward Jaquar group legacy.

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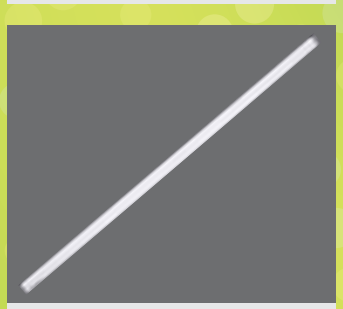

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UJALA scheme launched in Melaka, Malaysia

Energy Efficiency Services Limited (EESL), under Ministry of Power, Government of India has launched UJALA (Unnat Jyoti by Affordable Lighting for All) Scheme in the State of Melaka, Malaysia today . The Scheme was launched by Chief Minister of Melaka Datuk Seri Utama Ir. Hj. Idris Bin Hj. Haron. In due course of time, the successful Indian model of UJALA scheme has become a sought-after example for the different nations of the world and will now be implemented in Melaka to extend programme benefits to people of the region.

Under this scheme, each household in Melaka will get 10 high quality 9-watt LED bulbs at a cost of only RM 10, which is a special price and is almost half of what in begin offered in the market. The distribution of these LED bulbs will take place from 28 numbers of Japerun in the region. These Japerun are a unique community welfare and engagement centres, which are situated across the Melakan State. Under the extensive and ever-expanding idea of UJALA, Energy Efficiency Services Limited (EESL) plans to distribute about 1 million 9W LED bulbs, which will replace 18W CFLs. The initiative will have the logistical assistance and facilitation support from Green Growth Asia, which is a not for profit organisation. The price of each bulb will be way lesser than global average price of the LED bulbs, which still swings between 3-5 USD. Notably, each bulb that is being provided by EESL under the UJALA scheme in Melaka comes with a 3-year free replacement warranty against any technical defects. These bulbs sent from India will be of leading brands and manufacturers like Osram, Philips along with other companies of repute.

UJALA's impact in Malaysia will bring about clean energy, contribute to climate change targets and save the already dwindling energy resources. ■

Future Lighting Solutions and OSRAM Digital Systems sign Pan-Asia Distribution Agreement

Future Lighting Solutions, a well known provider of solid-state lighting and supply chain solutions, and OSRAM Digital Systems, the leader in lighting technology solutions, have revealed a new franchise partnership encompassing OSRAM's comprehensive range of drivers, light engines and controls for lighting applications. The agreement covers Asia.

The new OSRAM franchise brings a comprehensive new range of drivers, light engines, and controls to customers looking for high quality, performance and reliability in mainstream lighting applications. The agreement marks a new stage in the evolution of Future Lighting Solutions, which began at the start of the 21st century supplying LEDs to lighting customers, and has since developed into being a leading partner in the design and completion of lighting systems, with a full portfolio of light sources for LED lighting and smart lighting systems.

"Future Lighting Solutions has an outstanding reputation for providing OEMs with system-level technical design support and world class supply chain solutions. We welcome Future Lighting Solutions to our network and look forward to them delighting many customers with our products", said Wilhelm Cheng, APAC CEO of OSRAM Business Unit Digital Systems. ■

'Smart LED' venture iBahn launched by industry veterans

Rajeev Chopra, former Philips India CEO and former Global CEO, Business Group Home, Philips Lighting BV, has revealed the launch of a Smart LED Lighting venture - iBahn Illumination. The company has been formed along with the core leadership team that includes Arjun Shahani, Kunal Chaudhuri, and Sudeshna Mukhopadhyay.

Rajeev Chopra

A brainchild of the team that pioneered LED Lighting in India, iBahn, which has raised its first institutional round of funding from Sequoia India, aims to disrupt the market with its brand of 'Smart LED Lights,' Svarochi.

Rajeev Chopra, Co-Founder & CEO, iBahn Illumination, said "Our aim is to disrupt the market by offering a range of smart LEDs based on Bluetooth Mesh technology, which will enable users to control the intensity and colour of their lights through our easy to use Smartphone app. We believe the 'Smart LED' market is likely to be a `40,000 m ($600m) market by 2022. Our brand 'Svarochi' will offer innovative products that are high on functionality, easy to use, locally relevant and affordable."

'Svarochi' is a Sanskrit word which means 'brilliant appearance' and 'own ray'. Svarochi Smart Lights aspire to make spaces beautiful creating the perfect lighting effect for every room and every occasion using your Smartphone. All aspects of the product, right from the software to design and technology are conceptualised, developed and manufactured in India. Aiming to become a `5,000 million company in six years, iBahn will roll out its offerings pan India in a phased manner. ■

GOI's SLNP illuminates 50,000 KM of Indian roads

The Government of India's (GOI's) Street Lighting National programme (SLNP) has illuminated 50,000 KM of Indian roads with installation of 30 lakh LED street lights across the country. With this milestone Energy Efficiency Services Limited (EESL), a government of India company under the administration of Ministry of Power, has become the world's largest street light management company.

The installation of 30 lakh LED street lights has resulted in 39 crore kWh of annual energy savings, avoided capacity of over 104.19 MW to the Urban Local Bodies (ULBs). Further it has also helped in reduction of 3.29 lakh tonnes of CO2 annually.

Under SLNP, Rajasthan is leading the country with an installation of 7.85 lakh LED street lights followed by Andhra Pradesh and Gujarat with 6.03 lakhs and 5.4 lakhs respectively. Presently, EESL is retrofitting 15,000 conventional lights with LED street lights every day. Project is near completion in the states of Himachal Pradesh, Tripura and Gujarat. EESL is also implementing a special heritage lighting project in Kashi region of Uttar Pradesh where 4,000 lights are being installed. The programme has also recently commenced in the cities of Chandigarh and Port Blair, Andaman and Nicobar Islands.

Further, the procurement price of the LED Street Lights has been reduced from Rs. 135/watt to Rs. 80/watt due to mass procurement of the lights. EESL makes the entire upfront investment in installation of the Street Lights and no additional budget allocation from the Municipalities is required. Municipalities pay EESL from the savings in energy and maintenance cost over a 7-year period, making the LED lights affordable and accessible. EESL also undertakes social audits in ULBs where the project is under implementation and post the completion of the project. ■

New Research supports customised lighting solutions to reduce the negative impact of light on sleep

Lighting Science, well known in next-generation LED lighting solutions, reveals the comprehensive results from a study, 'The effects of spectral tuning of evening ambient light on melatonin suppression, alertness and sleep', published in the medical journal Physiology and Behavior. The study was conducted by the Division of Sleep and Circadian Disorders, at Brigham and Women's Hospital, a teaching affiliate of Harvard Medical School, with lighting technology provided by Rhode Island-based Lighting Science, makers of the noted GoodNight and Sleepy Baby pre-sleep consumer LEDs.

The study provides scientific evidence that selectively reducing the amount of short-wavelength (blue) light emitted by a light reduced the alerting effects of typical indoor bedroom intensities before bed. The C-LED light designed by Lighting Science Group had multiple benefits compared to typical fluorescent light including attenuating the suppression of the darkness hormone melatonin, slowing reaction times and reducing alertness as measured by brain activity patterns. ■

Wipro Lighting wins 'India LED Lighting Visionary Innovation Leadership' Award 2017

Sanjay Gupta, Sr Vice President and Business Head- Consumer Lighting and Switches at Wipro Consumer Care and Lighting receiving the award

Wipro Lighting, part of Wipro Enterprises (P) Limited and a well known player in lighting in India, has received the 'India LED Lighting Visionary Innovation Leadership' Award at the 2017 Frost & Sullivan India Best Practices Awards. The ceremony was held in Mumbai recently.

Frost & Sullivan Awards recognises companies across India and global markets for outstanding achievement and performance, superior leadership, technological innovation, customer service and strategic product development.

Sanjay Gupta, Sr Vice President and Business Head - Consumer Lighting and Switches at Wipro Consumer Care and Lighting, said, "We are truly honoured to have received the 2017 India LED Lighting Visionary Innovation Leadership Award. We are happy that our exceptional levels of performance, innovation & services in driving the adoption of LED lighting technology in India have been recognised by Frost & Sullivan."

Wipro will continue to bring new & advanced LED lighting technology for energy efficient smart lighting & data enabled new age lighting solutions to drive the sustainable future. In its constant pursuit of innovation, Wipro Lighting has now kick-started its efforts to add a new revolutionary LiFi lighting concept to their portfolio of innovative products with the help of pureLiFi who are global leaders in LiFi technology and commercialisation. ■

EESL and IOCL, BPCL & HPCL sign MoUs for distribution of Energy Efficient appliances

Energy Efficiency Services Limited (EESL), under the Ministry of Power, signed a Memorandum of Understanding (MoU) with Oil Marketing Companies (OMCs) under the Ministry of Petroleum and Natural Gas (MoPNG) for distribution of energy efficient appliances under the flagship Unnat Jeevan by Affordable LEDs and appliances for All (UJALA) scheme. According to the agreement, Oil Marketing Companies- IOCL, BPCL and HPCL will take up distribution of LED Bulbs, LED Tubelights and energy efficient Fans from select retail outlets across the country. The distribution of these energy efficient appliances will be conducted in a phased manner across these select outlets. In the first phase, distribution will commence from the states of Uttar Pradesh and Maharashtra.

The MoUs were signed with Indian Oil Corporation Limited (IOCL), Hindustan Petroleum Corporation Limited (HPCL) and Bharat Petroleum Corporation Limited (BPCL) in the august presence of Piyush Goyal, Minister of State (IC) for Power, Coal, New & Renewable Energy and Mines, and Dharmendra Pradhan, Minister of State (IC) for Petroleum and Natural Gas here.

As part of the MoUs with the OMCs, EESL will make the entire upfront investment for ensuring availability of the products at the outlets and no upfront capital cost will be borne by the OMCs barring manpower and space.

The consumer can purchase high quality 9W LED Bulbs for Rs 70, 20W LED Tubelight for Rs 220 and Five-Star Rated Ceiling Fan for Rs 1,200/-. ■

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Saurabh Kumar, Managing Director, EESL, said, "I am delighted that the Street Lighting National Programme has been widely accepted by the ULBs and the consumers, which has helped us in reaching this milestone. The bright lights have led to safer roads for both the pedestrians and motorists along with helping the ULBs to save energy and mange peak demand. We have committed to install 30 lakh LED street lights this fiscal and I am positive that we will achieve it before our stipulated time." ■

The world's first LiFi enabled light bar

The world's first LiFi enabled light bar will be demonstrated by pureLiFi and Linmore LED at Lux Live. Mainstream adoption of LiFi will be available within LED light bars, which will replace the most widely utilised light source in the world – fluorescent tubes.


Alistair Banham

The introduction of the first LED 'light bar' is forecasted to replace the most conventional form of lighting within commercial and industrial facilities: fluorescent tubes; with an estimated 3-4 billion installed throughout the world. pureLiFi and Linmore LED will demonstrate this new technology at LuxLive from the 15-16th of November as part of their LiFi experience zone.

Wireless connectivity is evolving. The spectrum now has to accommodate more mobile users and is forecasted to increase to 20 Billion devices (forming the IoT) by the year 2020 which will result in what is known as the Spectrum Crunch. However, LiFi can open up 1000 times more spectrum for wireless communications to combat this phenomenon. LiFi is a transformative technology changing the way we connect to the Internet by using the same light we use to illuminate our offices, home and even streets.

Alistair Banham, CEO of pureLiFi, said, "This partnership marks a step change for LiFi adoption. We can now offer new solutions that will help industry, future-proof their spaces, devices and technology to ensure they are ready to cope with the increased demand for highspeed, secure and mobile wireless communications." ■

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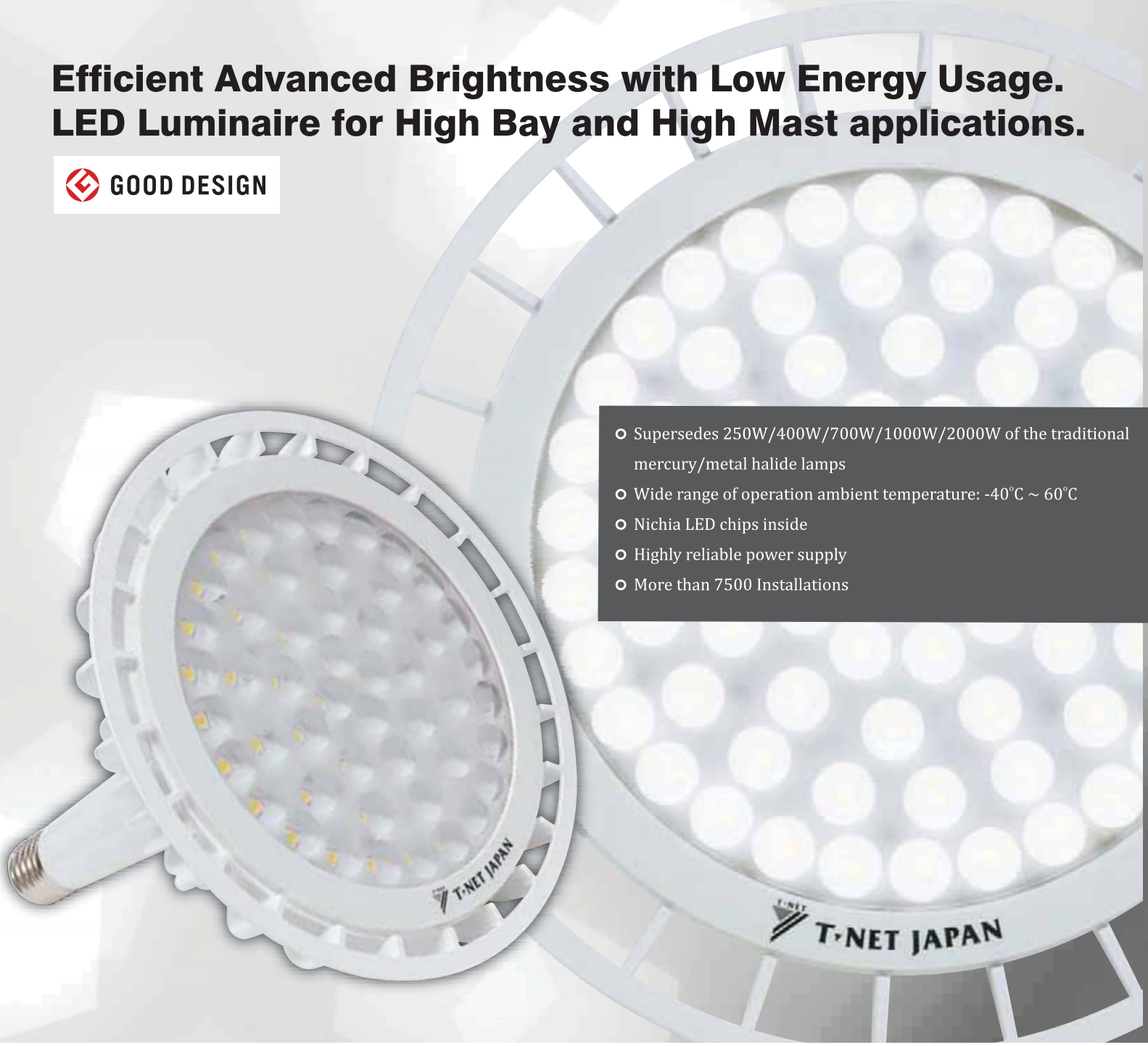

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Prices of LED Light Bulbs were on decline in September, says TrendForce

Prices of LED lightbulbs remained on the downtrend in September, reports LEDinside, a division of TrendForce. Compared with the prior month, the global average sales price (ASP) of 40-watt equivalent LED light bulbs fell by 2.1% to US$6.3, while the global ASP of the 60-watt equivalent products also dropped by 2.3% to US$7.5.

"Prices of LED light bulbs continued to fall in the U.S., the U.K. and Japan this September," said LEDinside analyst Allen Yu. "Japan again saw a more significant decline. Meanwhile, prices were generally stable in China, Germany, South Korea and Taiwan."

Prices of LED packages in the Chinese market anticipated to fall this fourth quarter due to rising inventories

Prices of LED packages in China remained stable this September. On the whole, demand in the market has become weaker, and LED chip suppliers have taken on additional capacity. However, chip and package suppliers' inventories were relatively low during the first half of 2017. While the slowing of demand have led to a build-up of inventories, package prices have not been significantly affected. If the demand still cannot keep pace with the supply increases of chips and packages in the fourth quarter, then chip and package suppliers in China will lower their prices to control their inventory levels. ■

Robe Deutschland HQ Inaugurated

Robe Deutschland officially celebrated the opening of its new HQ in Ismaning near Munich in an event, which also showcased Robe's brand new, just launched MegaPointe moving light to assembled guests and media.

A slick and streamlined event enabled guests to tour the new office, warehouse and Light Lab facilities, then experience a specular lightshow designed, programmed and operated by top Swiss LD Ronald Huber, illustrating the many features and functionality of the new MegaPointe, together with other versatile fixtures from Robe's current ranges.

The show was staged in a nearby venue hired to ensure there was enough space to optimise and properly show off the intensity and power of the MegaPointe.

The exciting hi-energy lightshow was enjoyed by many individuals – lighting / visual designers and other creatives, programmers, technicians – and those from a diversity of organisations – venues, TV studios, theatres, rental companies – most of whom stayed for several hours and enjoyed the networking and lively, stimulating environment.

In addition to enjoying the spectacle, guests could see products close-up and engage in a number of full demonstrations including the DL Series, the VIVA CMY and the RoboSpot series of follow-spotting products.

Robe Deutschland GmbH is a wholly-owned Robe subsidiary launched in April at the Prolight+Sound exhibition in Frankfurt. ■

Recipe for success: Thorn lights three food factories in Croatia

The Dobro project demanded a reliable solution that contrasts high IP protection with low energy consumption and low maintenance costs. The specified luminaires also had to comply with strict food certification standards and offer the flexibility to perform in various different areas with mounting heights of between 2.5 and 9 metres, ranging from food production and storage to packaging and dispatch. Thorn was able to utilise both its dedicated industrial product portfolio and extensive experience gained with similar projects to create a lighting concept that is perfectly aligned with the specific requirements outlined by Žito.

The ForceLED from Thorn proved to be the ideal solution for the production areas. This compact IP66 luminaire with a special prismatic diffuser has been installed throughout the 6000-square-metre facilities, delivering an outstanding light quality and distribution that helps employees get their jobs done safely and effectively. Good colour rendering of Ra80 and a colour temperature of 4000K also contribute to the pleasant working environment. The consistent levels of high-quality performance and the latest LED technology guarantee excellent energy efficiency and longer maintenance intervals. At the same time, the robust design and material specification help the ForceLED range fulfil the relevant HACCP, IFC and BRC food standards required by the client. ■

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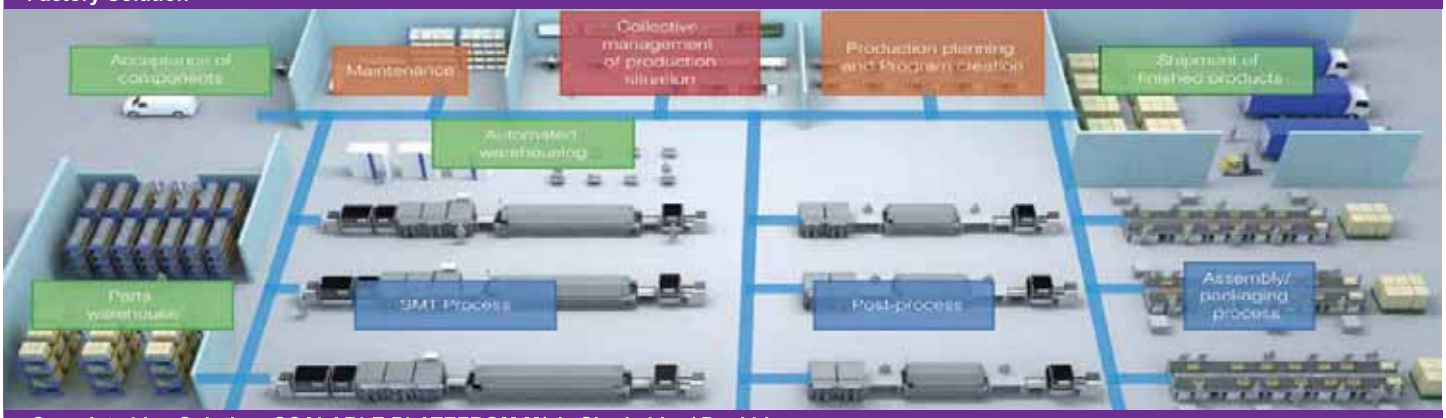

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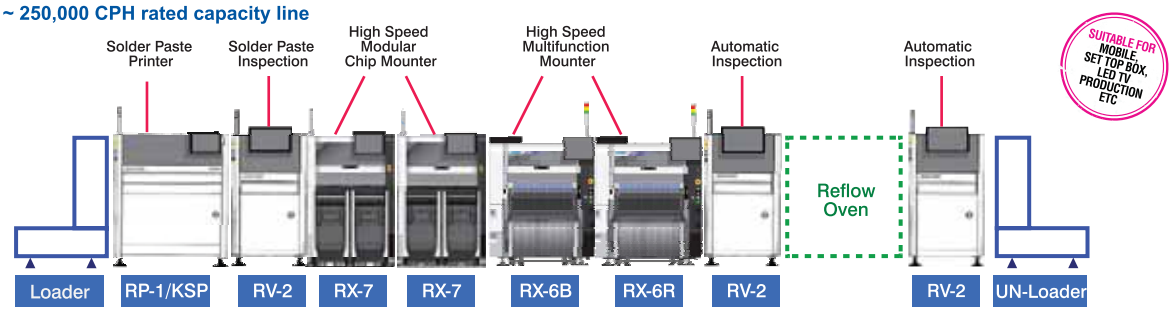

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Cree names Gregg Lowe as CEO

Gregg Lowe

Cree reveals the appointment of Gregg Lowe as president and Chief Executive Officer (CEO) and to the board of directors of Cree, effective September 27. Lowe succeeds Chuck Swoboda, per the transition plan announced in May. Coincident with this change, Robert Ingram, current board member and lead independent director of Cree, will assume the position of chairman of the board. Swoboda will remain on the board until the annual meeting of shareholders on October 24.

Lowe joins Cree with extensive leadership and deep industry experience. From 2012 through 2015, he served as president and CEO of Freescale Semiconductor, a $5 billion company with 17,000 employees and products serving automotive, industrial, consumer and communications markets. Prior to that, he had a long career spanning 28 years at Texas Instruments, most recently serving as senior vice president and leader of the analog business.

In addition to his experience with semiconductor companies, Lowe also holds numerous board positions including Silicon Labs in Austin, Texas; Baylor Healthcare System in Dallas, Texas; and The Rock and Roll Hall of Fame in Cleveland, Ohio, where he co-chairs the education committee for the board.

Lowe holds a Bachelor of Science degree in electrical engineering from the Rose-Hulman Institute of Technology and has completed the executive program at Stanford University. He is the recipient of the Rose-Hulman Institute of Technology Career Achievement Award. ■

Lighting Science appoints Technology Executive Khim Lee as President

Khim Lee

Lighting Science, the innovative LED lighting technology company focused on health, wellness and horticulture solutions, revealed the appointment of Khim Lee as President. With over 15 years' experience in LED lighting, management consulting, and private equity operations, Khim is ideally equipped to drive the next phase of growth at Lighting Science.

Since separating its private-label business and forming Global Value Lighting (GVL) earlier this year, Lighting Science is focused on its core mission of developing state-of-the-art products at the intersection of light and life. Khim will oversee all strategic and business aspects of the company, managing the creation of innovative biological, horticultural and urban lighting solutions for commercial and consumer markets, including brands such as GoodNight, GoodDay, and Sleepy Baby LED bulbs and the groundbreaking horticulture light, the GroBar.

Khim received his Bachelors Degree in Chemical Engineering and Economics from the University of California Berkeley and received his Masters in Mechanical Engineering from California Institute of Technology. He started his career at McKinsey & Co. in San Francisco, CA. Khim then served as Product Line Director at Philips Lumileds, a business group at Philips Lighting, where he launched and built its Mid-Power lighting LED product line. Most recently, Khim was at Vector Capital, a technology-focused private equity fund, where he led strategic and cross-portfolio initiatives across a portfolio of technology companies. ■

CIMCON Lighting appoints Rick Schuett as VP of Sales for the Americas

Rick Schuett

CIMCON Lighting, a well known provider of software powered LED controllers and Internet of Things (IoT) enabled Smart City lighting management solutions, revealed the appointment of industry veteran, Rick Schuett as Vice President (VP) of Sales for the Americas.

Rick comes to CIMCON with 25+ years' experience in the lighting and building controls, IoT and SaaS industries, where he has held executive leadership roles. He was most recently SVP Worldwide Sales at the Echelon Corporation where he was responsible for driving the Company's go-to-market strategies in both the lighting and LonWorks-based embedded systems business. Prior to Echelon, Schuett held key senior management roles at a variety of lighting and building controls companies including Lutron Electronics, Autani and Encelium.

Anil Agrawal, CEO, CIMCON Lighting, "We are pleased to have Rick join CIMCON and drive the acceleration of our Americas' business. His knowledge of the lighting controls space combined with his passion for enabling connected Smart Cities is a perfect fit with CIMCON's accelerated push to grow the market for connected Smart Cities. Rick will be instrumental in bringing our new sensor platform that enables smart parking, traffic counting, noise and pollution data collection, waste management optimisation, and more to market." ■

Claypaky wins the 'Plasa Award of Innovation' with the K-EYE HCR K-20

The Claypaky K-EYE HCR has won the Plasa Award for Innovation, the most renowned and distinguished prize in the entertainment lighting industry. The award is assigned by a strict jury made up only of expert professionals in the field, who carefully analyse the various products. It is a highly significant prize specifically because it places great emphasis on product innovation, which is one of Claypaky's underlying key values, around which all the company's design efforts and products revolve.

The jury gave the following motivation for the award: "An LEDwash light that delivers a new approach to accurate colour rendering starting at chip level rather than manipulating existing sources."

Pio Nahum, Claypaky's CEO, welcomed this acknowledgement with great pleasure and illustrated the original specifications behind the K-EYE's design: "For years, our most demanding customers felt the need for a light that differed from the others not so much for the number of special effect devices, but also and especially for the 'quality' of the light it produced. This is a very difficult parameter to define, since it relates to perception: it is the sum of multiple factors such as diffusion uniformity, colour temperature, colour control features, and most of all a high colour rendering index. To meet these requirements, Claypaky and Osram have developed a technology named HCR, used in the K-EYE range and in ADB's Klemantis." ■

ZerOS RigSync wins PLASA Innovation Award

Eaton's popular Zero 88 lighting control brand continues its winning ways; collecting a coveted PLASA (Professional Lighting & Sound Association) 2017 'Award for Innovation' for the cool and inventive 'RigSync' feature, a feature available with the latest version of its powerful and flexible ZerOS console software.

RigSync demystifies the work of DMX addressing for console users, allowing them more time to focus on being imaginative; while the technical elements sort themselves out via the console communicating with the lighting rig.

The judges commented, "RigSync opens up lighting creativity opportunities for non-technical people in an entry-level environment".

The PLASA Awards for Innovation aim to recognise and reward new product ideas, and are independently judged by a task-force of industry specialists.

Perfect for multiple scenarios, RigSync automatically ensures the console and the rig are – and remain - continuously synchronised, effectively invisibly solving potential 'disputes' like colliding DMX addresses or change in fixture modes. ■

Leviton wins 2017 Lighting for Tomorrow Award from American Lighting Association

Leviton revealed that the Decora Smart with Wi-Fi Technology 1000W Universal LED/Incandescent Dimmer received a 2017 Lighting for Tomorrow award in the category of Connected Lighting. Sponsored by the American Lighting Association, the Consortium for Energy Efficiency and UL, Lighting for Tomorrow is a competition that challenges manufacturers to develop residential lighting products that can successfully incorporate advances in both design and energy efficiency. The Leviton submission, along with 130 other product entries, was judged by a panel of industry professionals at the UL University facility in North Carolina. The panel reviewed solutions ranging from LED indoor fixtures to ceiling fan lights – many of which were recognized as outstanding products that demonstrate developments in form factor and construction, while taking advantage of solid state lighting technology.

The Decora Smart Dimmer with Wi-Fi Technology is an innovative smart lighting solution offering homeowners remote access, app-based scheduling and voice control of lighting inside and outside of their homes. The device simplifies home lighting control by automating interior and exterior lights using the free My Leviton app. Lighting for Tomorrow judges described the Decora Smart solution as a 'simple yet smart lighting control that is a great alternative to a complex system; it's intuitive and easy to understand, a great introductory option for customers that still provides energy saving action.' ■

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Automotive OE Lighting Market is all set for a Rapid Growth

Some of the key players' operative in the global automotive OE lighting are Delphi Automotive PLC, Flextronics Automotive GmbH & Co. KG, Odelo, Visteon Corporation, Federal-Mogul Corporation, Koito Manufacturing Co. Ltd.

According to the Zion Market Research report, the global automotive OE lighting market accounted for around US$ 14.89 Billion in 2016 and is expected to reach approximately US$ 22.76 Billion by 2022, growing at a CAGR of around 7.31% between 2017 and 2022.

The growth of global automotive OE lighting market is primarily attributed to growing lighting regulations for better visual and safety across the globe. In addition, increasing demand for premium segment vehicles paired with manufacturer's efforts to keep pace with technological changes in OE lighting systems are also some of the key supporting factors predicted to shape the growth of automotive OE lighting market in years to come. Demand for advanced lighting solutions due to rapidly changing infrastructure of road in developing economics, consumers leaning towards personal transportation & convenience and performance improvement with cost reduction are also major contributing factors expected to favour the growth of global automotive OE lighting market in analysis period. Restriction over high beam lights in some region may limit the growth of automotive OE lighting market in coming years. Nonetheless, collaboration of automotive OEM with lighting system manufacturers is expected to open up alluring opportunities for automotive OE lighting market in near future.

Amongst, the entire three products namely Halogen, HID Xenon, and LED Lights; LED Lights are expected to dominate product segment of the automotive OE lighting market in an analysis period. Integration of LED technology by manufacturers for differentiation via lighting design and additional functionalities is predicted to contribute the market growth. OEMs are also expected to invest in the design and development of eco-friendly lighting systems such as organic LEDs (OLEDs) in forecast period. Further, HID Xenon is also expected to become another noticeable product segment in the forecast period. Based on position, global automotive OE lighting is categorised into front lighting, rear lighting, side lighting and interior lighting. Front lighting emerged as a leading position segment for automotive OE lighting market and also predicted to grow with highest CAGR forecast period.

Passenger Vehicles segment held the largest market share in 2016 and accounted for over half of the total market share. The growth of this segment is mainly attributed to government regulations regarding sufficient installation of lighting equipment in passenger vehicles.

In 2016, Asia Pacific dominated the global automotive OE lighting market. Strong growth in the vehicle production and presence of key manufacturer in region will be key driving factors for Asia Pacific region in years to come. North America and Europe are also expected to offer significant growth opportunities in automotive OE lighting market in coming years. The growth of this region is mainly attributed stringent regulation of government over automotive lighting paired developed infrastructure of road have led the growth automotive OE lighting market. Popularity of sports cars in the young generation with fancy and elegance is also predicted to support growth of automotive OE lighting market in this region.

Some of the key players' operative in the global automotive OE lighting are Delphi Automotive PLC, Flextronics Automotive GmbH & Co. KG, Odelo, Visteon Corporation, Federal-Mogul Corporation, Koito Manufacturing Co. Ltd. Other participants in the global market are ZKW, Covestro, Lumileds, Hella KGaA Hueck & Co., Gentex Corporation, Ichikoh Industries Ltd., Grupo Antolin Irausa S.A, OSRAM AG, Stanley Electric Co., Ltd., Hyundai Mobis Co., Ltd. and Valeo SA amongst others. ■

Paul Matter's exploration in Space, Light and Sequence

The pieces draw from a rich material palette that includes aged brass, copper, stone, leather and mouth blown glass. The studio is committed to on-demand production, which allows for each piece to be customised to a client's needs. Parts are assembled by hand, one lamp at a time...

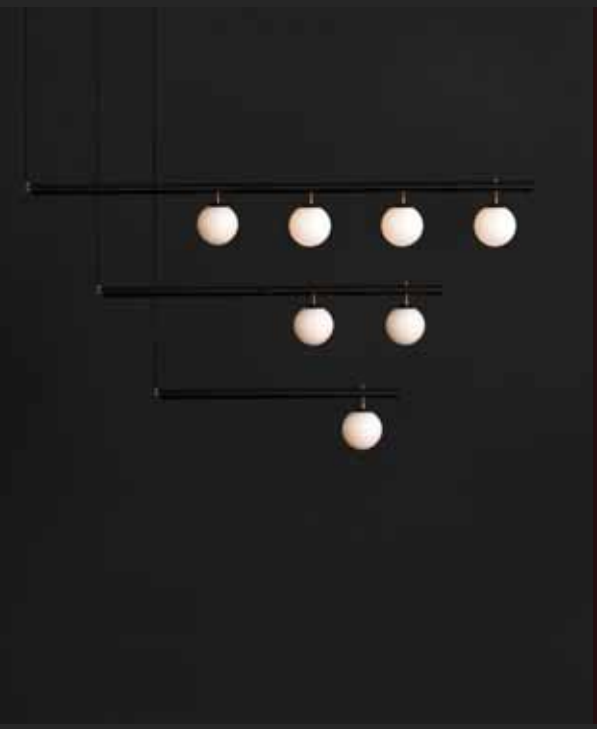
Paul Matter is a contemporary lighting design studio founded in 2016. The studio's original and custom lamps for residential and commercial settings take cues from mid-century Modernism, the Industrial Age, and studio's own minimalist aesthetic. The studio revisits iconic motifs across the range of these influences to create its own distinctive collections.

SATELLITE is inspired by the Conceptual and Minimalist movement of the 60's and 70's. Sol Le witt's work inspired the basic concept behind Satellite. These light sculptures are fundamentally geometric and architectonic, and rely on the cube as a starting point for explorations in space, light, form, volume, repetition, sequence, and variation.

Articulating arms enable a 180 degree movement on the horizontal plane. The pieces can be used as individual fixtures or in number of combinations forming light sculptures levitating in space. Individual fixtures are SATELLITE ONE, TWO and FOUR. They can be combined in various permutations and combinations to form interesting arrangements such as SATELLITE TWO + ONE can be used over a dining space, it has also been used in a bed room format. SATELLITE FOUR + TWO + ONE can be used as a chandelier in various formations.

The fixtures are interdependent on the space they are used in. They can inspire the space with the way they distribute light. The defined form and straight lines enable the element of Play and illustrate Balance in a subtle and sophisticated manner.

The pieces are drawn from a rich material palette that includes aged brass, burnt brass, brushed brass and mouth blown glass. They are custom pieces that allow us to customise as per clients requirements in terms of finish combinations and drop lengths. ■



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Philips Lighting illuminates iconic government buildings on Raisina Hill, New Delhi

In all, approximately 662 light points have been implemented to create the stunning lighting effects. The light points are controlled by the advanced light management system, Philips Color Kinetics Light System Manager gen5, which can store multiple preset scenes, creating unique light shows with varied effects like ripple, cross-fade, particle and burst.

Philips Lighting revealed the illumination of North and South Block of the Central Secretariat building in New Delhi using Philips dynamic façade lighting. These iconic buildings house the Cabinet Secretariat, which administers the Government of India and are an integral part of India's historical and political heritage.

The buildings were built in 1931and are home to the Prime Minister's Office (PMO) and Ministries of Defence, Finance, Home Affairs and External Affairs of the Cabinet of India. Situated on Raisina Hill, New Delhi, the Secretariat comprises two blocks of symmetrical buildings (North Block and South Block) on opposite sides of the great axis of Rajpath, and flanking the Rashtrapati Bhavan, or the President's House.

Philips Color Kinetics utilises the latest advancements in LED technology to create themes and customised light recipes that can be used for important national festivals and celebrations. Additionally, the system also has dimming features that will enable the buildings to reduce electrical consumption during non-peak hours. In all, approximately 662 light points have been implemented to create the stunning lighting effects. The light points are controlled by the advanced light management system, Philips Color Kinetics Light System Manager gen5, which can store multiple preset scenes, creating unique light shows with varied effects like ripple, cross-fade, particle and burst. The lighting was installed by the Central Public Works Department (CPWD), an attached organisation of the Ministry of Housing and Urban Affairs, Government of India.

Sumit Joshi, Vice Chairman and Managing Director, Philips Lighting India, said, "We are honoured to be involved in this prestigious project to illuminate the North and South Block of the Central Secretariat in New Delhi. Starting this week, our dynamic LED lighting will illuminate these buildings using a palette of 16 million colors that will accentuate the rich blend of traditional Indian and British architecture. The new dynamic lighting system is also energy efficient and will make these buildings a visual treat." ■

Philips Lighting casts a new light on North and South Block of Central Secretariat in New Delhi

dhoom dhaam

Ariane Thakore an Interior Architect from Kent Institute of Art and Design is the Founder and Designer of 'This and That' design studio. Her studio brings into life the age old tradition of handcrafted furniture. Her passion for restaurant designing drove her to design the Indian eatery house '**Dhoom Dhaam**'. She narrates the story behind this restaurant to **Lighting India**.

Client Rushad Ginwala is a restaurateur since 30 years in Ahmedabad who has had two very strong brands in the city-one being Tomato's and the other Mirch Masala. These restaurants have been popular for the last twenty years in Ahmedabad and have a very strong presence and basically a success story.

He got a space and did not know what to do with it. This was a project where we all were involved in the conception of the restaurant from scratch.

We all were involved in first deciding the kind of food we would like to have in this restaurant with Rushad. Then after going through numerous names and having had many debates- I finally suggested 'Dhoom Dhaam' and it was instantly accepted. DHOOM DHAAM– meaning celebration – celebrating modern comfort food - became the theme of the restaurant, which by default led us to the concept of the interiors of the restaurant as modern Indian restaurant.

The restaurant had to be placed next to a Tomato's and Mirch Masala who already had a strong presence. The challenge for Rushad was to bring a new brand, which had an equally strong presence with interiors and food and branding. The challenge for me was to design a restaurant completely different from them at the same time came an impact like no other.

So I decided to go for a slightly formal, finer dining look. It being modern India food the deco also deemed to be modern with some Indian accents to the place.

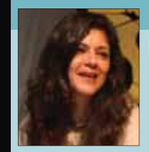
I started with a colour pallet first. I wanted a minimalistic look as well as monochromatic look -a neutral feel and so worked on achieving that pallet, using grey and greens and highlighting them with brass and black and white accents.

The furniture was designed specially by 'This and That' for this restaurant and is now called the 'Dhoom Dhaam' collection. The most difficult part with the restaurant was the lights. I spoke to various different people to make instillations. We got a few proposals but none of them seemed right. We struggled and researched and looked for inspiration everywhere and one day I got some inspiration and their came the idea of using 'Thals' as a light instillation. After many attempts and samples we got it right and it was just perfect. The light became the centre piece for the restaurant. After that everything fell into place. The wall brackets and hanging lights were also all made on site.

Photography credits for the restaurant - Samir Pathak

After the 'Thals' came into the picture, the logo had the pestle mortar. We knew we had to bring in Indian accents further into the restaurant using these similar elements. It came in various forms of which one form was using a stencil on the walls to finish the walls conceptualised by Sweta Parikh- using some Jaara's, wooden ladles, a whole collection of old and new pestle mortars in different shapes, sizes, materials, which finished the look of the restaurant.

I brought in Grafico, a branding solution team containing of Ashit and Sweta Parikh- were in Ashit jokingly says he is an extension of me when it comes to design. He was involved with me in some of the visualisation of the interiors, a photographer, a food critic also being part of their contributions along with Sweta doing the actual branding, designing of the menus and so much more. ■



Ariane Thakore
Founder & Designer at 'This and That'

We are firmly embarked on the path to become INDIA's No 1 Global Scale producer...

Kwality Photonics has put India on the global LED map by setting up an ultra-modern fully-automatic LED plant with a capacity of a billion LEDs per annum. The company has high brand equity in the domestic market. The new company set up this year — LEDchip Indus Pvt Ltd — is a DIPP recognised start up enterprise and is financed by SIDBI at Hyderabad. **K VijayKumar Gupta, CEO, Kwality Photonics P Ltd and LEDChip Indus P Ltd** speaks to **Lighting India** about his company and the various issues.

Q How do you perceive the current LED market in India?

A Current LED market is the brightest spot (pun intended) in the otherwise difficult economy. As per latest view of our Association ELCOMA, the proportion of LED Lamps in Sales has increased enormously.

Last year LED business contributed to 54% of total Lighting sales and projected to be more than 70% in 2017.

This is inspite of fact that the industry faced issues like Demonetization, GST, E-waste rules, MEITY CRO scheme etc which disrupted the sales last year

Q Can you tell us about your product portfolio and also talk about your best selling LED products?

A LEDChip Indus is the sole Indian producer of LEDs - technically called as LED packages. We are in LED Semiconductor Components production since 1987 and even before that in LED R&D at IISC, BARC, TIFR & CEL since 1977.

Historically Indian market is highly fragmented characterised by low volumes across DIP LED, Segmented Displays & SMD LEDs. We are into all the product segments and of late specialised as mass producer in SMD LEDs for White Light.

Q We would like to know which segment of the market according to you is your best customer?

A For Kwality-LEDchip Indus, the Lighting Segment is the major market now. Of recent multiplicity of LED packages have converged into one size called 2835 SMD and we have created high production capacity in this 2835 LED. We offer 2835 0.2Watt for tubelights, 2835 0.5Watt for bulbs & Downlights, and 2835/3030 1.0Watt. Though basic LED voltage is 3V, we readily developed 6V, 9V 18V options for innovative applications in lighting.

Q What is your company's contribution towards the mission 'Make in India'?

A A late beginner India marched into LED Lighting in the giant strides of EESL, who played the role of Demand Consolidator and gave confidence to Indian Enterprises to invest in Huge capacities of LED assembly process & to supporting ancillary industries in Casting, Molding, MCPCBs, & EMS. It created huge manual employment beyond any other industry and allowed wider diffusion of the knowledge and offered huge opportunity to many small time supervisors with enterprising outlook. The Lighting applications use entirely SMD LEDs which are difficult to solder manually. This ushered rapid adoption of mechanized soldering or SMT machines, which the industry was resisting since a decade due to fragmented volumes.

What was conspicuous by absence was local production of LED components. The entire Electronic Component Industry was wiped out when the import duties became zero under ITA1996 in agreement. Some one has to come out of comfort zone and take the lead. As the senior player the market for LEDs, the Kwality Group took decision to make investments in scale that would put India firmly on the Global LED MAP. We went for the most modern automation technology, poured our 40 years of study into the production process and succeeded in LED production at very competitive cost. Our vision is to reach 10 billion LEDs capacity rapidly and 100 billion capacity in short term. All our LEDs have LM80 compliance with 99% brightness retention after 9 month test at super high temperatures of 105°C.

We know how lighting makers in India feel when 'imported' (read as Chinese) lights steal the market from under their nose. This same spirit will drive the patronage to pure India made LEDs from all the members of Indian lighting industry, since LED is lone non-Indian component in their otherwise fully Indian B.O.M. And why not, especially when the quality is proven and when prices are inviting. Kwality is already is a trusted brand name in the Indian Electronic Sector.

Q Can you tell us your views on GST?

A GST will help automate the indirect taxation process, and ultimately mainstream the whole business cycle. This may eliminate the off-line transactions and push the market to compete on merit basis.

Q How do you cope up with the ever-changing technology in the LED space?

A LED technology is rapidly developing and the packaging innovations are happening all around. We are keen students of this field, have access to developments from all corners of the world and have access to technology innovators. Our investments are selected in a way to support emerging process like Flipchip, CSP, COB, DOB, SOB etc. If opportunity arises, we will not hesitate to make India leapfrog to next generation Lighting Sources.

Q Can you tell us about your start-up 'LEDchip Indus Pvt Ltd'? What can the customers look forward to from this expansion?

A LEDchip Indus is spun off as a startup to harness benefits of the make-in-India incentives by GOI, to build tech-savvy culture in the work force, to adapt best Industry practices and to imbibe progressive customer oriented processes. The mix of 80 man-years of experience with young eager engineers has given us vigour & optimism to take on the world best and prove that India can do it better.

Q Who are your major clients? Can you name a few? What message do you have for the prospective clients?

A We have over 2000 loyal customers spread across metros & towns of India, including large, medium and small makers.

Q What kind of innovations can we look forward to in the LED space?

A Best LED sources are still confined to InGaN & other III-V elements. The recent micro LEDs & OLEDs are better suited for non lighting applications. The LED lights are howerever getting transformed to intelligent lighting and LiFi where they will play a dominating role in last mile communications..

Q What are your future plans?

A We are firmly embarked on the path to become INDIA's No1 Global Scale producer of LEDs. We are going for innvoative financing and scaling up to put India as a place to reckon as producer of professional grade LEDs. ■

Security Lighting in Urban Areas

Lighting can help to protect people and valuable property from criminal activities because of its effect on clarity and vision. Other forms of lighting, such as decorative floodlighting, shop window lighting, outdoor display lighting and park lighting, can contribute to this goal, but they are designed with additional criteria in designers or Architect mind. In public realm spaces, generally expert security lighting is designed to help everyone see clearly all around the area.

Security lighting is installed in the dark urban areas to help protect people and valuable property from criminal acts. Other forms of lighting, such as decorative floodlighting, shop window lighting, outdoor display lighting and park lighting, can contribute to this goal, but they are designed with additional criteria in designers or Architect mind.

Lighting can help to protect people and valuable property from criminal activities because of its effect on clarity and vision. In public realm spaces, generally expert security lighting is designed to help everyone see clearly all around the area.

This means that people approaching towards anyone can be easily identified and that other people's or criminal

Figure 1: Security lighting in Public area of a residential complex

activities can be seen from a distance (see Figure 1). This has the effect of deviate the odds in favour of the authentic and against the criminal. The law-abiding are unlikely to be taken by astonishment, while criminals are more uncertain about whether their activities have been endorsed or they have been recognised. In safe and secure spaces to which the public does not have clear access, it is desirable to use effective lighting to enhance the vision of guards or security while hindering the vision of potential invaders.

1. Functions of Security Lighting

Lighting is only a part of the security system. The complete system generally include physical elements, such as wired fences, security gates, alarm sensors and locks; a detection element, involving security guards patrolling or remote surveillance by CCTV cameras; and a response element, which determines what is to be done after the detection occurs. Unless proposed security lighting is integrated into the complete system of security, it is unlikely to be successful. For example, good lighting in a storage area which nobody is watching, and hence in that there is less or no possibility of a response, it will simply help criminals do what they want to do, even more quickly.

2. Factors to be Considered

The essence of the lighting to be used as part of the security system will be resolved by various features of the site. The following factors that always need to be considered are given below:

2.1 Type of Site

Various sites can be conveniently segregate by the extent to which people have access to the site and the presence or absence of physical security such as fences. Broadly, there are three types of sites.

- Secure areas, where there are physical securities and to which access is controlled by gates, such as a public park.
- Public areas, where people may be present at any time and which have no physical security, such as a shopping centre car park or open parking areas, open public realm areas and unfenced play grounds.
- Private areas, where there are no physical securities but where the general public is not expected to be present during night, such as official buildings within their open landscape and courtyards.

2.2 Site Features

One component of a site that can have a maximum influence on the type of security lighting adopted is the amount to which the site is hampered. Where a single building occupies an important part of the site and visually consists of the only items of value, it may be more effective to floodlight the building rather than to light the total site area.

Where there are multiple obstructions, as in an open public park having small pavilions or buildings, the whole site should be lit in a form that minimises shadows (see Figure 3).

Another important character is the moderate reflectance of the surfaces within the site. High reflectance surfaces increase the extent of inter-reflected light and this both shadows and glare.

2.3 Ambient Light Levels

The illuminances formed by the security lighting need to at

Figure 2: Floodlighting on the valuable building instead of the total site area

least match or preferably outpace the illuminances of the surrounding area. Unless, this is done, the area enclosed by the security lighting will look dimly lit. See Figure 4, only a few part of the area is clearly visible, rest is masked by shadows.

2.4 Crime Risk

The frequency and type of crimes occurring in various locations can vary widely. The level of risk will already be built into the level of security used on secure sites but this is not achievable in public areas.

In public areas, increasing probability of crime is correlated with increasing illuminances used for security lighting.

2.5 CCTV Surveillance

CCTV cameras are widely used for remote surveillance of big campuses and large areas. The extent of light required for

Figure 3: Lighting in a public park with less/very few shadows. Shadow less arrangement of lights can enhance the security level of open Public Park

Figure 4: A garage area lit by High power flood light. Flood light distribution, obstruction, results in hard contrast with strong shadows. Such lighting installations will not help to improve security

effective operation of CCTV cameras can differ dramatically from starlight to huge level security lighting. Manufacturers indicate a minimum illuminance required for their cameras to capture a clear picture. These values usually assume an incandescent lamp.

Higher illuminances may be desired for other light sources with various spectral power distributions. Further, if moving objects/people are to be easily seen, illuminances more than the minimum will be required, whatever the main light source is. The manufacturer of CCTV cameras should be consulted before electing the light source, to be used, if there is any doubt about the sensitivity of the camera.

The other aspect of cameras that demand care is their rather limited effective range. A high level of illuminance

Figure 5: High level of luminance in an underpass with uniformity eliminates the requirement of CCTV cameras

Figure 6: Perfect example of area lighting in a big parking lot in terms of security

Figure 5: High level of luminance in an underpass with uniformity eliminates the requirement of CCTV cameras

uniformity is mandatory if dark areas in the CCTV capture are to be avoided (see Figure 5).

Further, care should be taken to place CCTV cameras in such positions where they do not capture any light directly from the luminaires as such light will sometimes results a 'white-out' of that part of the captured image.

2.6 Impact on the Surrounding Area

Security lighting should be defined to the covered or protected area. Stray light from a security lighting installation may be considered to be light infraction by neighbours and a source of sky bloom by others. Furthermore, where signal lights are used to control traffic on roads and railways, care should be taken to evade confusion created by either disability glare to the viewer, veiling reflections on the signals, or the recognition of the security lighting itself as a signal.

3. Approaches to Security Lighting

3.1 Secure Areas

The first question to acknowledge is whether to light the space at all. It can be argued that lighting a protected area advertises the existence of something worth taking and hence attracts criminals, so keeping the area dark is a better approach. However, if the criminal already recognise the area contains valuable materials, then the absence of brightness makes the secure area more difficult to protect. Thus, the choice of whether to provide lighting or not, depend on the owner's assessment of risk involved. If the risk of criminal action is high, lighting is desirable. If the risk of criminal action is low, then providing unnecessary lighting may be counterproductive.

3.2 Area Lighting

Area lighting is generally used in big open areas such as storage yards and container terminals, parking lots, etc. (see Figure 6). Typically, these sites are lighted equally by floodlighting or roadway lights on poles 10 m (30 feet) or more in height. For typical roadway and floodlighting luminaires mounted singly on light poles, the desired illuminance equality can be achieved mostly by balance the luminaires at six times their mounting height. The actual balance will depend on the luminous intensity distribution of the luminaire (for which help of the lighting consultant is required).

If the area is unobstructed by trees, shrubs, for structures like car sheds or site topography, the most economic installation will be one very high pole carrying many high-wattage lamps (see Figure 7). However, this result is a false economy as it also produces the poorest illuminance uniformity, the harshest shadows, and the greatest intensity of light trespass. If the area contains obstructions, like small buildings or sheds, a lighting design utilising multiple source locations will cut down shadowing.

This is true if the luminaires are placed within the site, between obstructions, and with overlapping light patterns. Reflectance of site materials can also be utilised to advantage. If the owner uses facade materials that are painted a highly reflective colour, or paves the area with concrete rather than asphalt, light diffusely reflected from such surfaces will diminish the depth of shadows. ■

Ashish Batra
Architect cum Urban Planner

Human Scale Lighting

The importance of the human scale in urban illumination – harnessing light as a social tool to frame perceptions, emotions and experiences

This concept is at the heart of the Zumtobel commitment to develop a dedicated product portfolio for the illumination of outdoor environments. With a constant eye on innovative technologies and material quality, the goal is to provide designers with a toolbox of lighting instruments that lets them devise solutions to a human scale, in all sizes and concepts. This means that public spaces can be turned into places with a specific identity, raising the quality of life in urban environments that have been designed by people – and thereby transforming them into urban environments that are designed for people.

LED technology gives us the possibility to rethink the lighting fixtures development and consequently to promote an innovative approach towards lighting design. If within the indoor lighting design steps forward towards a human centred approach have already been done, in the outdoor lighting the 'functional' concept is still dominating the scenario.

But we should consider that the people are living outdoor spaces more intensively, especially looking to 24 hours cities, and a lot of different human activities are taking place when the darkness falls. That is why we should scale down the outdoor lighting to a human level, considering the psychological aspects, which include safety and orientation factors, but focus on people's emotions, social interactions

People playing basketball during dusk hours

Rhodes old town

and quality of wellbeing.

It is established that urban planners and architects are working with scales (urban scale, architectural scale, human scale). The scale that is used now to plan new or renovated urban environments is close to a human level. Special key areas for pedestrians and social interactions are needed within 24 hour cities, creating places to raise the wellbeing of the people that live the outdoor spaces.

At night we are often faced with bright situations influenced by technological elements or economic considerations. Sometimes theories such as 'the more the better' (often associated with ideas of safety) dominate the scene, whilst other approaches focus on the ever-increasing problem of light pollution, leading to the illumination of urban areas using distorted lighting solutions and abnormal lighting effects. These often bear little or no relation to how people interact with the urban context and take little account of considerations such as history, character and, perhaps most importantly, the natural night-time condition: darkness. Perhaps it was better when torches lit up the streets and, as buildings sprang up all around, light truly responded to the needs of the city's inhabitants.

Certainly, now, our perception of spaces (and their liveability) has evolved sufficiently for us to question how the light (considered as a 'filter' that enables people to perceive the reality of the night) should really work. We now think much more about just how we experience an environment, taking into account the myriad of factors that coexist and interact with humans in the nocturnal ecosystem – and which vary depending on factors such as geographical position and the level of human settlement.

The pictures on next page shows an example of how the same urban environment can play host to different human activities or be associated with requirements that characterise the various periods of the night.

As we look to the future, a Human Scale Lighting is needed to take a step forward, especially when we reflect on the gradual change that is shaping cities, society and human behaviour. The challenge is to adapt something that could well be considered an element of the built environment – artificial light – to reflect human dynamics and the morphological characteristics of the space around us.

The activities associated with an urban space play a key role in defining the level of wellbeing. We will be able to

Later evening hours: Soft light along traffic routes offers orientation and safety and trees lit vertically improve spatial perception. The station can be seen from all around thanks to its well-illuminated façade. Other softly accentuated buildings complete the nocturnal cityscape.

Middle of the night: Only a few people are still crossing the park, accompanied by adaptive light. Vertical illumination of the trees along the main paths provides orientation and a feeling of safety. The station square and station façade are still softly illuminated for late-night travellers.

Just before sunrise: The first commuters use the park. Trees are vertically illuminated to show the way and gentle light on the pavements further enhances orientation. High illuminance levels highlight the station square as the focal point, while dynamic lighting scenarios brighten up part of the square to stimulate interaction.

Dario Maccheroni, Lighting Application Manager, Zumtobel Lighting GmbH also explains his insights on Outdoor Lighting with the help of few questions below:

1. What role does LED technology play concerning the planning and development of lighting solutions for outdoor applications? Does LED technology have a direct influence on the planning or is the influence (still) limited to the exchange of the illuminant?

   LED brought an extreme change within the lighting industry and the lighting design discipline. Especially in the indoor lighting the way to develop a luminaire or a lighting scheme has got a big transformation.

   I believe that we should rethink now the lighting approach towards the urban spaces. LED gives us the possibility to follow with light the human behaviors and activities that nowadays are taking place increasingly during the night. As miniaturised light source it enables the fixture designers to go for smaller dimensions as in the past and to separate different lighting functionalities within a single luminaires.

   I think that barely we will stay with luminaires shape as the past ones, I believe this is the moment we should rethink the luminaire design instead, starting from this innovative light source, building the fixture around it, enhancing its features in order to serve the human needs and preserving the natural ecosystem.

2. In which way should outdoor lighting throughout the day and especially the night change or adapt in your opinion? (Note: here I am referring to the layers of Light, which are mentioned in your article.)

   Due to the considerations above, we can then rethink also the lighting approach towards the outdoors. As I said, the people are having different activities within different times of the night. So we should consider to change the lighting scenario in order to adapt to the people needs within a specific time. Planning with the 'layers of light' concept in mind can help to get closer to the human needs. Each layer has a specific goal and the interplay of different layers can give a specific light solution based on the specific human needs and behaviors in that specific moment. This can only be realised if we use multifunctional and flexible luminaires and an advanced control system.

3. Especially in city centres there are numerous aspects, which have to be taken into account when it comes to lighting. 'The human scale' sounds like a very simple and logical principle. But how is it possible to connect all aspects: the well-being and security of people, road safety and architectural lighting?

   The Human Scale Lighting concept is mainly focused on urban areas lived by people, or at least that should be used by them. The first aspect of this concept is to work with both horizontal and (mainly) vertical illumination. The reason is that the 60-70% of the human visual field is focused on vertical surfaces and we can achieve a better level of space perception and comfort only if we work with vertical planes. That is why architectural lighting is an important part of this concept to enhance safety and comfort.

   A lit vertical surface reflects the light and became a lighting source itself. This improves vertical illumination that contribute to face recognition (safety) and helps objects to become focal points / landmarks (orientation).

   But the concept follows also other topics, in line with the miniaturisation and the multifunctional aspects of the luminaires and the layers of light design concept. Thanks to this we are able to adapt light to the variety of architectural situations we have in outdoor and to the human needs. Light has to be tailored around the people, every project has to be different to another, every urban situation has to be studied before approaching with the lighting design.

illuminate spaces more to a human scale by adapting the light to meet various needs and by using it in a bespoke way in terms of timing and design. The general absence of seamless solutions over the course of 24 hours, leads us to analyse night-time in a completely new way. The identification of human actions in specific night periods can help us to intelligently and effectively design the light around the people needs, playing with and overlapping the right layers of light.

The concept of Human Scale Lighting can be seen in many ways and can help us clearly understand the strength of the bond between the lighting of the space and the people that actually use the space. We can almost view light like a changing organism that is closely related to man and his emotional sphere, capable of filtering the reality that surrounds us and thereby influencing the way we experience and perceive our immediate environment.

Concretely this means that public spaces can be turned into places with a specific identity, raising the quality of life in urban environments that have been designed by people – and thereby transforming them into urban environments that are designed for people. ■

Dario Maccheroni
Lighting Application Manager
Zumtobel Lighting GmbH

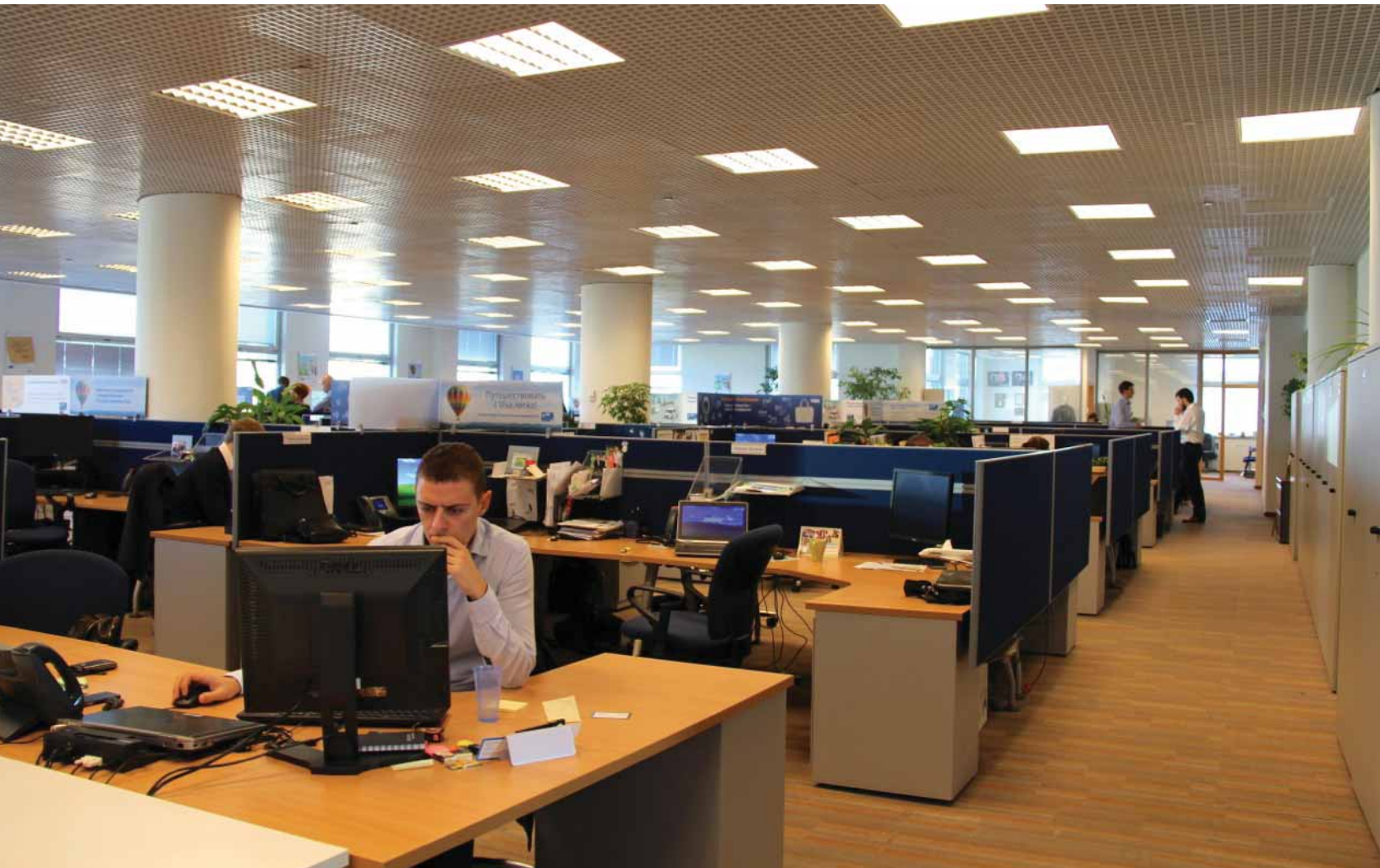
Indoor Lighting Is Being Fueled by LEDs

The LED revolution is driven by Asia Pacific, Europe, and North America. Further growth will be less centralised and challenge leading global participants. LED replacement lamps are now at a price point that can effectively challenge conventional technologies and take over the market significantly by 2020.

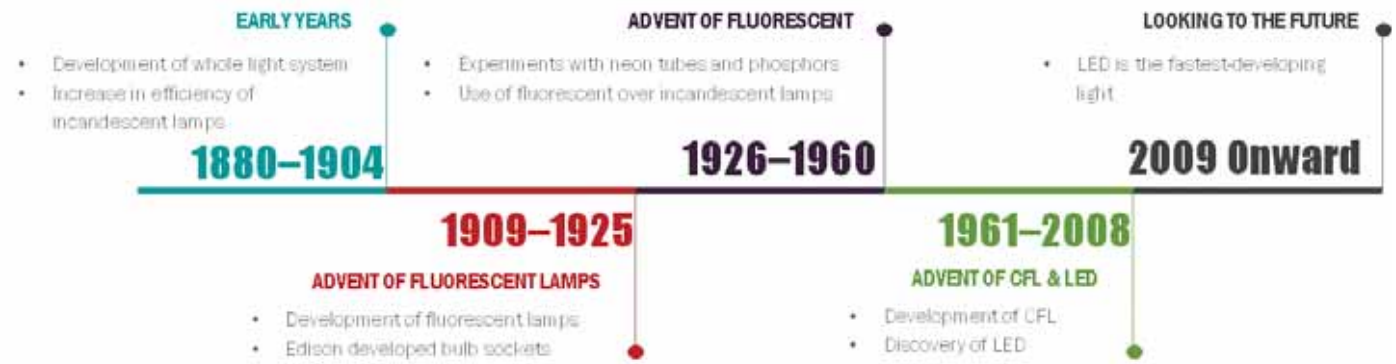
Nowadays, almost everybody is talking about implementing light-emitting diodes (LEDs) in the indoor lighting sector. The US Department of Energy (DOE) has been at the forefront of the solid-state lighting revolution. DOE has supported a market study predicting the market penetration of LED in general illumination applications ever since 2002. The forecast offered a comprehensive overview of the probable LED adoption path within the US, estimating energy savings from LED products out to 2030. Approximately 50% of the general indoor lighting industry is said to have been engulfed by the LED fever as per various lighting expert sources. The report showed that the LED implementation awareness has grown steadily. But, what are the reasons for the much hype about this LED lighting? Let us check out the main factors for the adoption of the most sought-after LED technology in this article.

Key Benefits of Using LED Light Sources in Indoor Environment

- Competitive Advantages: Most of the lighting professionals rely on LED as it provides them competitive advantages. Most of the lighting companies have already implemented LED solutions. LED is an efficient solution, boosting the productivity of workers, and enabling better quality control, easier operation (instant on/off), safety, and cost-efficacy. LED enhances light levels and quality of illumination, reduces light energy consumption significantly, requires less maintenance, and offers rebates (60% of the project). The LED is also eligible for tax savings (according to the Energy Policy Act). LED saves time, which leads to the timely construction of projects. By 2030, LED lighting is estimated to reach 84% market share of lumen-hour sales in the general illumination



Evolution of light and LED lighting



Source: White Papers, Expert Interviews, Industry Journals, and MarketsandMarkets Analysis

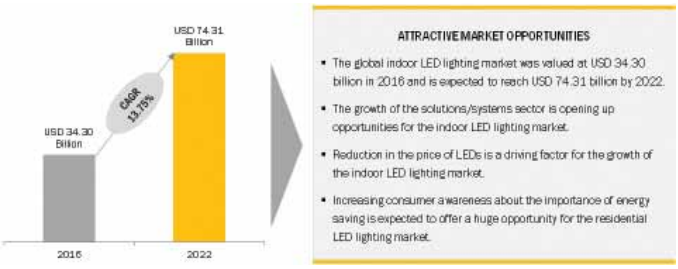
market. This will reduce lighting energy consumption by 40%, for 3.0 quads (261 terawatt-hours) savings, worth over USD 26 billion (as per the current energy price) and equivalent to the total energy consumed by ~24 million US homes.

- Huge Cost Saving: In accordance with the US Energy Information Administration (EIA), a 60-watt incandescent lamp on an average produces 16 lumens per watt and has a lifetime of 1,000 hours; a CFL produces 67 lumens per watt and lasts for 10,000 hours; and an LED produces 83 lumens per watt with 30,000 hours lifetime. The long-term energy and financial savings from the shift in lighting technology are consequently huge. In addition, the cost of LED lamps is estimated to drop, and their competence and lifetime are expected to improve. EIA forecasts that if the LED light usage predominates by 2027, the lamps can reduce the energy consumption of 44 1,000-megawatt electric power plants annually.
- Great Opportunities: LED provides great opportunities to the commercial, residential, industrial, and other indoor lighting applications. Lighting solution providers can build highly effective LED systems for a building digitally. Even if energy savings from LED are quite impressive (as cited by MarketsandMarkets), there is a huge opportunity for further savings by accelerating investment in cost and efficiency improvements.
- Growing Market: According to MarketsandMarkets, the global indoor LED lighting market will grow from USD 29.41 billion in 2015 to USD 74.31 billion by 2022, at a CAGR of 13.75% during the forecast period (2016–2022). To take advantage of incredible cost and energy savings from the use of LED lights, government organisations, restaurants, and hospitals are retrofitting buildings and switching to LEDs from conventional lighting. To cater to the growing market for LED illumination and ease installation and conversion costs, software companies and manufacturers introduced lighting as a service (LaaS) model as a new approach for installing and controlling LED lights. Illumination is now powered, connected, and controlled digitally through LaaS. The innovation encompasses short- and long-term gains, such as reduced energy costs, improved energy efficiency, and the ability to harness and inspect a wide array of digital analytics. LaaS can lead to major cost savings for restaurants and hospitals. Significant cost savings can also be harnessed by retrofitting conventional hospital lighting systems with LED lights and using LaaS system.
- Low Maintenance Cost: Usually, LED illuminations have 6–10 years of life span when continuously operated, whereas fluorescent illumination needs to be changed every year, adding up maintenance fees. Facility administrators can include day lighting controls in patient rooms with enlarged window space, saving energy consumption and costs. In accordance with the US DOE, natural lighting exposure can lead to 12% increase in patient recovery time, 2.5% lower staff absenteeism, improved productivity and job satisfaction, and psychological well-being. Unoccupied space, such as restrooms, stairwells, mechanical rooms, and service areas, can be controlled and dimmed through LaaS to reduce energy consumption and costs.

Indoor LED Lighting Market: Key Global Trends

- Lighting Control to gain a pivotal role with LED due to long-term increase in functionality. LED will lead to a more complex control system, offering comfort, security, and flexibility to end users. The average price of a control system will rise especially in Europe and North America by 2019 besides the increase in units globally.
- 2013 and 2014—the breakthrough years for LED in the professional market in Europe, North America, and China. 2014 has seen important inroads for LED in the large residential market, which let LED to pass 40% penetration of entire lighting sales in 2015.
- LED replacement bulbs made considerable progress in residential application globally.
- Europe and North America to mature first—higher growth rates during the forecast period in younger markets.
- Europe — Implemented EU ban on incandescent and prospective ban on halogen, driving LED adoption in the region.

Indoor LED lighting market offers lucrative opportunities OWING to rapid rise of new solutions/ SYSTEMS sector



Source: White Papers, Expert Interviews, Industry Journals, and MarketsandMarkets Analysis

Key industry insights

Source: Industry Experts and Primary Interviews

- North America: Incandescent ban stimulated demand; utility rebates making solid-state lighting (SSL) affordable.
- Latin America: Price is a key barrier to the adoption outside of high-end projects. LED will increasingly be able to challenge CFL.
- Asia Pacific: China and India embracing indoor LED and leading change for the region.
- Middle East and Africa: Growth expected in the second half of the forecast period—sharp price decline.
- Revenue Forecast Globally—2013–2022 (North America, Europe, Asia Pacific, Middle East and Africa, and Latin America) — APAC is the largest market.
- Revenue Forecast by Application: Commercial (retail, office, and hospitality) and industrial lighting will have higher growth rates, and residential lighting will have the largest market (in terms of revenue) by 2022.
- Asia Pacific — The largest market for indoor LED lighting in the globe. The market scenario in this region features aggressive expansion of production facilities by manufacturers, anticipating a positive outlook. Key companies such as Samsung (South Korea) and Philips Lighting (Netherlands) are investing considerably on advanced OLED display technology development. Residential and commercial applications will boost the market for indoor general lighting. Nevertheless, residential users are projected to drive the market with slower adoption than commercial applications in offices, hotels, hospitals, and other areas.
- India is forecasted to be one of the most profitable markets, largely supplemented by favorable government initiatives and growth of the smartphone and automotive market. The Government of India's LED program is expected to emerge as a win-win from the consumer point of view. The government has changed the contours of procuring and distributing LED bulbs across India, putting the project on the fast track. With the improvement in economies of scale and number of producers, LED bulbs will become more affordable.
- Smart buildings, on behalf of convergence of green and smart technology trends, will become progressively important and a driver for consultancy-based services.
- Performance contracting is progressively becoming a market mainstay—end users are enthusiastic about maximising cost savings and enhancing competence.
- Lighting-as-a-service (leasing-type models and 'pay-as-you-use' services) gaining a grip in the industry for enabling businesses to reduce upfront capital expenditure.
- Cloud-based services with strong data interpretation focus will be key enablers for new-generation intelligent buildings.

Companies such as Philips Lighting Holding B.V. (Netherlands), Cree, Inc. (US), OSRAM Licht AG (Germany), GE Lighting (US), Eaton Corporation plc (Ireland), Dialight plc (UK), and Zumtobel Group AG (Austria) are identified as the key players in the indoor LED lighting ecosystem.

Companies such as Digital Lumens (US), Fulham Co., Ltd. (US), LED Engin, Inc. (US), Lumenpulse Group (Canada), and LED Lighting Systems, LLC (US) are identified as key innovators owing to their contribution to the indoor LED lighting market in the form of innovative solutions.

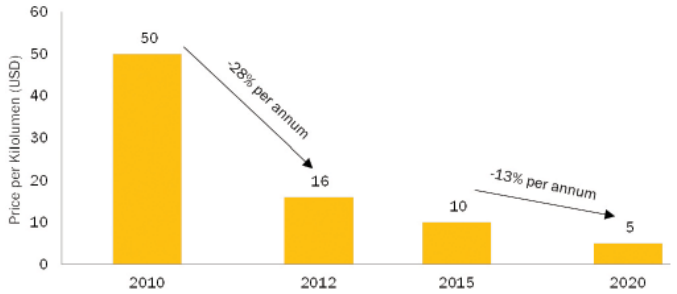
Summarising Key Points

A good number of companies are employing smart LED solutions for cost-efficacy and completing construction within the specified time. The LED revolution is driven by Asia Pacific, Europe, and North America. Further growth will be less centralised and challenge leading global participants. LED replacement lamps are now at a price point that can effectively challenge conventional technologies and take over the market significantly by 2020. The challenge is to provide non-commoditised products, making the most of digital LED illumination advantages. LED drivers and lighting management solutions will be the key factors.

LED Revolution across the Globe

- Retrofitting bases with LED light: It is a boom time for US LED manufacturers under President Donald Trump for securing major lighting contracts.
- IoT set up a standard for sensors in LED fixtures: Top LED producers, Internet of Things (IoT) technology companies, and industry groups established the IoT-Ready

Reduction in LED prices



Source: US Department of Energy

Alliance for the installation of IoT technology in luminaires. The alliance is setting industry standards to enable LED light fixtures to be IoT-ready, facilitating a swift and easy installation of superior IoT sensors—as simple as changing a light bulb.

- Lighting now considered as a significant element in urban residential development: New government regulations supporting sustainability and the awareness of environmental issues are the prime growth drivers for indoor LED lighting. Rapid technological evolutions in this domain are driving the adoption of intelligent lighting in both residential and commercial space.
- Strict energy compliance regulations from the European Commission: Using the energy efficiently, Europeans can lower energy bills, reduce reliance on external oil suppliers and gas, and protect the environment. Energy efficiency has increased at all stages of energy chain, starting from generation to final consumption. EU has planned 20% energy savings target by 2020, equivalent to turning off 400 power stations. In November 2016, the Commission proposed an update to the Energy Efficiency Directive, together with new 30% energy efficiency target for 2030, and actions for updating Directives to meet new targets. Policies for improving energy efficiency in Europe comprise an annual decline of 1.5% in national energy sales; EU countries making energy-efficient renovation to minimum 3% of buildings (central governments); minimum energy efficiency standards and labeling for products such as boilers, household appliances, lighting, and televisions; preparation of National Energy Efficiency Action Plans every 3 years by EU countries; and other measures.

LED Implementation Future – Roads Ahead 2017

LED replacement lamp is the winner in the medium-term for replacing conventional technologies across the world. LaaS on cloud-based networks for customised application management will pave the way for connected lighting, living, and enhanced energy and facility management. Capitalising, leasing, and maintenance are other service models expected to evolve around LaaS. LED lighting controls are a new-generation lighting management system to target verticals—offices focusing on energy saving aspects and residential focusing on ambience.

Residential

- Low Energy Saving—A part of growing zero-emission concept
- High Effect/Ambience—Mainstream due to falling price and increasing end-user awareness

Offices

- High Energy Saving—Potential in retrofit and new smaller offices—still plenty
- Low Effect/Ambience—Controlling the CT/RGB/CRI for enhancing the well-being and productivity of workers

Retail and Hospitality

- Low Energy Saving—Strong demand from secondary facilities (corridors, staff rooms)
- High Effect/Ambience—LED increasingly used in ambient lighting for influencing customer mood

Industrial

- Low Energy Saving—Still low penetration and large potential (warehouses)
- Very Low Effect/Ambience—Creating the best lighting environment for assembly and precision working

Gear Up for the Revolution

Market participants should work in association with building management system (BMS) companies and must work with indoor lighting and HVAC. With robust growth forecast, establishing market presence, network of connections, and customer relationships is essential for future success. With performance contracting becoming the preferred business model of customers, suppliers need to develop service capabilities or associate with facility management companies and energy service providers for partaking in the dynamic part of the market. The global adoption of innovative lighting solutions has been on an upswing with amazing success in the European and Japanese markets.

Even if LED solution has a high initial setup cost, it should not be ignored for getting the long-run benefits in the industry. The companies should not shy away from implementing LEDs; they should rather treat this as an investment to keep pace with technological growth. It would be better if the organisations can get rid of all skepticism about LED lighting services and move toward fast LED implementation. LED streamlines project operations in the commercial and industrial sectors. ■

Alarka Gosh
Research Analyst
MarketsandMarkets

Lighting for Emerging Cities

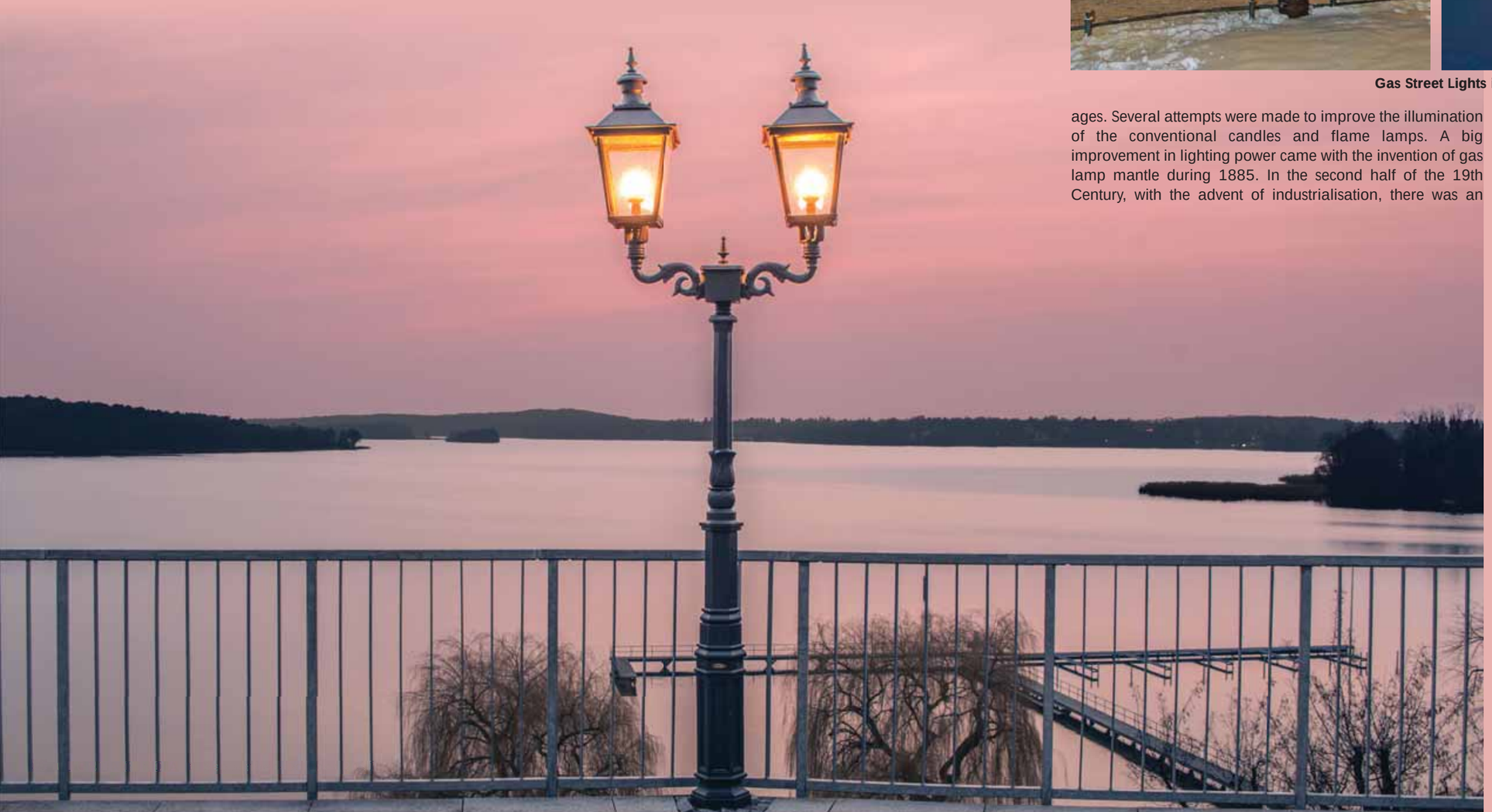
Artificial lighting plays a highly visible role in the overall presentation of the emerging city. It helps increase safety in areas that people use, aids in geographic orientation as people can use well-lit focal points as landmarks to help them find their way...

LIFE as we know it is based on the electromagnetic interactions between the particles of matter. All the life forms on earth have been evolving and making use of the electromagnetic spectrum in some way or the other to interpret their surroundings and to adapt to their environment.

Visible Light is only a small portion of the Electromagnetic spectrum. It however has a profound effect on the psychological as well as physiological functioning of the animals and humans. The visible light or the absence of it has been deeply tied to the circadian biological clock of the living beings on Earth.

For us humans, however, there is more to it than just the psychological and physiological aspects of the visible light. Our perception of light is deeply rooted in cultural history of humanity. The intrinsic qualities of visible light have shaped every aspect of human life, from Art to Architecture.

Primitive methods of illumination such as candles, gas or oil lamps have been the main sources of artificial light for ages. Several attempts were made to improve the illumination of the conventional candles and flame lamps. A big improvement in lighting power came with the invention of gas lamp mantle during 1885. In the second half of the 19th Century, with the advent of industrialisation, there was an increasing demand for improved illumination, especially in the factories working round the clock to maximise returns. It was however electricity which prompted inventors to develop ways of converting it directly into light. An incandescent light bulb thus came into existence owing to the independent research done by Joseph Swan (Britain) and Thomas Edison (USA).



Picture Courtesy: www.wmf.org

Gas Street Lights in Berlin, Germany

Since then sources of artificial light have been constantly evolving to produce more and more light per unit of the energy consumed. These highly advanced sources of artificial light have made it easier for us to gain better control over the use of light and minimise wastage of energy. At the same time inventors have been constantly trying to improve these sources to simulate effects of natural light.

There has been a vast amount of research on artificial light and its effects on human health. Many studies suggest that artificial light has adverse effects on human health. The human body is governed by its internal biological clock which regulates its functions, behaviour, sleep etc. This internal biological clock, the Circadian Rhythm, of the human body is programmed to follow the day and night cycle. Natural light is the main factor responsible for regulating this mechanism. But with ever increasing use of artificial light in human life, this natural cycle of the human bodies is being easily affected. Because major portion of the world population lives in and around the cities, most often people are exposed to unwanted artificial light from their surroundings, which plausibly has an effect on their health. It is therefore essential for Architects, Urban Designers and the lighting manufacturers to develop ways to tackle problems associated with artificial light at the

Lighting of pedestrian ways and main roads

same time improving the quality of human life. It is also essential for us to study how artificial light is used in the planning of cities around the world.

Artificial lighting plays a highly visible role in the overall presentation of the emerging city.

It helps increase safety in areas that people use, aids in geographic orientation as people can use well-lit focal points as landmarks to help them find their way. For instance, a well-lit historic place draws attention to the uniqueness of an area as well as highlights the identity of the area, creates a sense of drama.

But creation of such well lit public spaces in a city demands a thorough study and a single strategy; 'A Lighting Master Plan' that states the objectives in proper design language and creates a technical framework for planning at local level. It works as a practical guide for the municipal authority in all decisions relating to public lighting.

A lighting master plan is always based on a general concept, which is prepared considering the requirements of the society, the topography, the history, and the rhythm of the town with all its cultural and commercial activities. The concept is then transformed into lighting proposals on a smaller scale for every neighbourhood in the municipality taking into account all key factors: ambience, safety, light pollution and energy consumption. The Lighting Master Plan also contains recommendations for maintaining luminaries and replacing lamps.

Masterplanning

Such a lighting design guide for a city is drawn from a need to extend the day ambience of the city into the night and thus creating a different set of experience for the visitors.

A Lighting Master Plan helps in expressing the image and character of a city through lighting. It facilitates full enjoyment of outdoor space (which during daytime can be unpleasantly hot) and reduction in energy consumption through careful planning.

Design Considerations:

One of the important considerations in developing public spaces is the design and placement of exterior lights. Exterior lights, particularly building façade lighting should be architecturally compatible with its surroundings and should not create glare, light overspill or light pollution. Care should be taken in positioning of new lights so that they do not stand out in relationship to the surroundings. Special conditions relating to street character are also important considerations in determining an appropriate light fixture. Qualities such as the architectural or historical character of the building or park edge, the density of a tree canopy, and the degree of ambient light are the factors that strongly impact the effectiveness and appropriateness of various light fixtures and must be included in the analysis of lighting concepts.

All these design considerations form an integral part of a Lighting Master Plan, which gives lighting policy guidelines in order to develop a nightscape that is attractive, environmentally successful and economical.

The design policies may consist of:

- Distinguishing the main roads from the surrounding streets through use of distinct road lighting character. The same concept can be extended to distinguish the market places, squares and residential areas through the use of differing colour values of 'white' light.
- Making provision for façade lighting of prominent public buildings and structures as it helps bring out the character of the surroundings.
- Minimising night sky light pollution by adopting good lighting design practice, appropriate equipment

specification and proper aiming of installed lighting.

- Establishing maximum limits on the luminance of internally and externally illuminated advertising and signage.
- Defining heights of street light columns in residential areas so that they are in proportion to the scale of adjacent buildings.
- Operational control of lighting throughout the city including lighting for roads, streets, public spaces, structures, landscapes and waterscapes.

Planning At Smaller Scale

Sociability is a difficult quality for a place to achieve, but it can become an unmistakable feature. The sociability depends on the type of activities and the users in a place.

There should also be a good balance between different genders, people of different ages who are using the space.

In many situations, particularly when people are concerned about security, there is a tendency to over-light a park, plaza, street, or other public spaces. But sometimes too much lighting can be just as bad as too little lighting. The key to developing a good plan is to relate lighting to the evening functions of a particular space.

Although its primary purpose is nighttime visibility for security and safety, successful street lighting takes into account the human users of the street. For example, one way to emphasize pedestrian activity over automobile traffic is to replace standard overhead street lights with smaller scale. However, as a luminaire's height is lowered, the lamp's brightness must be adjusted so that is does not create excessive glare for pedestrians. At the same time, the lumen output of the fixtures must also be capable of adequately lighting the area.

As mentioned before, a Lighting Master Plan gives inputs for planning on local level. Detailed planning is required at this scale considering the technical aspects such as types of luminaries, lamps, colour temperatures, glare etc.

Apart from these technical aspects, one has to give careful attention to every situation which has different requirements in terms of lighting.

Entrances: Planned evening lighting around building entrances contributes to the safety of an area even more than the use of bright lighting that is not focused on areas of use.

Edges: The edges of a park or plaza, particularly any interesting gateposts, compound walls, and trees visible from the adjacent street should be lit to help define and identify the interior space. Buildings located on the edges of a park can also have provisions for façade lighting bringing attention to the larger area beyond the park.

Architectural details: Lighting entrances, archways, cornices, columns etc. can attract attention to the uniqueness of a building, place, or district and bring a sense of drama to the experience of walking at night.

Focal points: Lit sculptures, fountains, bridges, towers, and other major elements in an area, especially those visible to pedestrians and vehicles, may form landmarks at night.

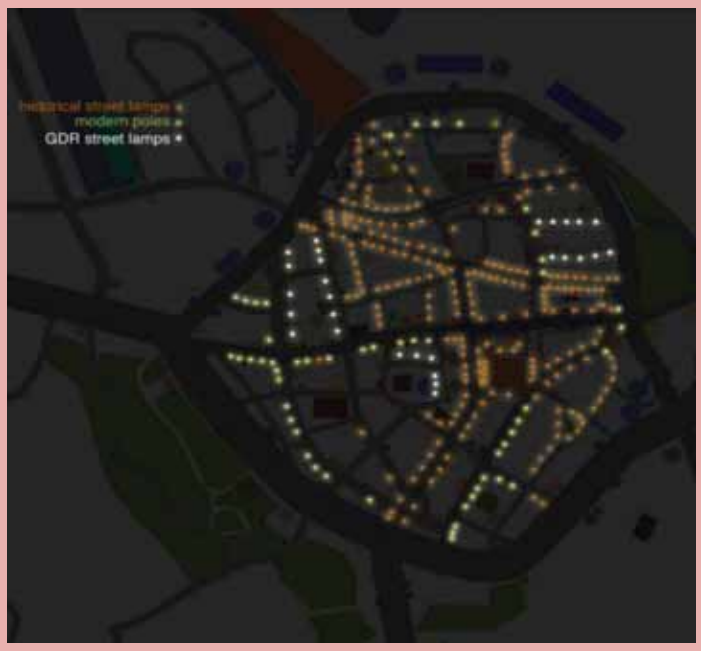
Landscape: Trees, shrubs can be used to crate dramatic effects like moonlighting. A row of trees lit with ground recessed uplighters defines a pathway or a street and gives substantial reflected light in the space.

Transit stops: People feel more secure when bus or train stations are well-lit. Lighting also draws attention to and encourages use of such amenities.

Signage: Well-lit maps, along with directional and informational signage, are essential to providing orientation at night.

Retail displays: Lighting retail displays, even when stores are closed, not only provides ambient light for the street but can also help to increase the number of people on a street, which is a major contributor to security.

Lighting Master Plan Proposal, Wismar, Germany



Survey of Existing Lighting, Wismar, Germany

Types of lamps & luminaries

Different sources of illumination vary significantly with respect to the quality of light they provide. This, in turn, has a dramatic effect upon the appearance and safety of a place at night. High-pressure sodium, the light source typically used in city street-light fixtures, casts a yellowish-orange glow that results in poor colour rendition; it compromises visual clarity and reduces the overall quality of the nighttime urban environment.

By contrast, metal halide as a light source produces a soft, white glow that renders colour accurately; it offers better visual clarity, improves reaction time for vehicles, and requires less wattage for the same perceived visibility. At the same time, one also has to consider the cultural preferences to the light colour and colour temperatures.

The latest advances in LED technology have made it possible to have better control over the characteristics like beam angles, lumen output, colour rendering etc. Huge reduction in power consumption has been the main advantage LEDs have offered over the conventional light sources.

Glare and light trespass

The obtrusive aspects of lighting, such as glare, trespass, energy waste and sky glow often extend well beyond the boundaries of the area in which the lighting is installed and intended for use. These obtrusive aspects can have serious consequences for the public health, safety and welfare, but they can also be effectively controlled or eliminated with a careful attention to design, installation and use. Glare and excessive contrast caused by poorly shielded luminaries and overlighting affect everyone's ability to see and as eyes age they become particularly susceptible to these disabling effects.

Though lighting may sometimes be effective in attracting people in a space, overlighting interferes with the visibility on adjacent roads or may disturb the residents of the adjoining area. Therefore balancing of these opposite interests is a crucial aspect, which has to be considered while designing.

Architectural Lighting, after all, is not a magic wand that can transform a place into a successful public space, but it requires planning at all levels and a Part to Whole relationship is of utmost importance. ■

Ninad Jogdand
LIGHT@WORK Design Consultants Pvt. Ltd.

Canada's First Railway Tunnel Lights Up for the First Time

Philips Lighting illuminates the previously unused - almost 160-year old- Brockville Railway Tunnel in Brockville, Canada. Dynamic LED lighting showcases the unique architectural and geological components of the railway tunnel. The newly-illuminated tunnel is set to become a central hub of the town to drive community engagement and bolster tourism...

Philips Lighting, a well known leader in lighting, recently revealed that the newly renovated Brockville Railway Tunnel is now illuminated with Philips Color Kinetics dynamic LED lighting. The 525-metre tunnel has been transformed with more than 700 Philips Color Kinetics ColorGraze MX4 Powercore fixtures turning the mostly unused railway tunnel into a visually stunning walkway.

The lighting inside the tunnel will run a dynamic 'Philips Light Show' 365 days a year, drawing in residents and tourists alike. Residents are also able to request custom lightshows for events held on the waterfront. It will become a central hub to host community events and festivals year-round, further cementing it as one of the iconic, must-see landmarks in the Thousand Islands region in Canada.

David LeSueur, City of Brockville Councillor and Brockville Railway Tunnel Committee Chair, said, "The Brockville Tunnel is a remarkable historical landmark and we had a vision to transform it into a true international attraction. With the Philips' architectural LED lighting, we have created something wonderful for the community and visitors."

Originally constructed in the late 1850s, the Brockville Rail Tunnel was the first of its kind in Canada. Located underneath the downtown area of Brockville, Ontario, the Railway Tunnel will now act as a path from the city's beautiful waterfront to the scenic Brock Trail recreational pathway.

Grazing fixtures were specifically chosen for the inside of the railway in order to showcase the unique architectural and geological components of this pre-Confederate tunnel.

David Bouwers M.E, Ford Electric Co. Ltd., lead lighting & infrastructure design team for the Brockville Tunnel project, explained, "While working on the concept, the design and implementation of the re-opening of Canada's First Railway Tunnel, Philips Color Kinetics LED lighting system was a perfect solution to bring Ford Electric's vision together. Our design team wanted to turn what had become an overlooked part of the City of Brockville into a safe, energetic and vibrant attraction not only for the local community but also to change the historic tunnel into a tourist attraction on the world stage."

Michael Gentile, President & CEO, Philips Lighting, Canada, said, "Light has the ability to transform and rejuvenate spaces and communities. With Philips Color Kinetics LED lighting, the beautiful architectural and geological details of the historical Brockville Tunnel are prominently featured while the dynamic light show enhances the experience for visitors." ■

"The key to success in India is to focus on what is unique..."

T-Net International has been engaged in manufacturing of environment-friendly products from large LED light to assembly parts for automotive, OA, and consumer electronics. In an exclusive interview with **Lighting India**, **A. Tomita, Chief Operation Officer (COO), T-Net International (H.K.) Co. Limited**, of the company is giving some updates on their business. Excerpts...

Q What fascinated T-Net Japan to explore the Indian market?

A 'T-Net' is an innovative, fast growing, integrated lighting solutions company, with international sales & supporting operations towards more than 10 countries around the world.

Since we are quite keen to the strong commitment on R&D and Innovation, and based on this concept, we tell ourselves that we are specialised in manufacturing high-powered outdoor & indoor lighting equipment.

Now as you know, Indian lighting industry has been growing around 17 – 18 % throughout the past 2-3 years, and is projected to clock Rs

12,000 crore -15,000 turnovers in the next 2-3 years horizontally, we are quite interested in sharing this market with our confident product range.

Around 70% would be LED-based, as per Electric Lamp and Component Manufacturers Association of India (ELCOMA) and McKinsey's projections. According to ELCOMA, the LED segment in this country is expected to grow by 40% in 2016, and is one of the fastest growing segments.

In summary, the fast-growing market size, rate of the growth, trend of LED lighting adoption in Industrial and Infrastructure Segments, are some of the key points to look for Indian markets seriously in the past couple of years.

Q Can you tell us about your partnership with KEI Lighting in India.

A Kripa Electronics (India) Limited (KEI) – Lighting Business Division is our best business partner and associates for the Indian market over these years. We believe that we have a reasonable understanding for various focused segments in Indian market, through KEI. They have been working on each project developments in India, and brought us great customer references, boosting our further focus and investment to the Indian market.

Q How do you perceive the Indian markets for LED?

A The key to success in India is to focus on what is unique on the brand and product, originated from its technological view. It offers numerous possibilities for installation designing and application. With this concept, we believe that major areas of product differentiation on our products shall be our Success-Pillars, that is based on technology, design, application, and plus service. Our team has been working straight towards this.

The other perception for the Indian Market that we try and wish to share is a deep understanding of the requirements from our targeted customers. That is 'Know Your Customers (KYC)'.

Q Can you tell us about the NV series that has entered Indian market? We would like to know about the segments that it caters to?

A Currently we have quite big names, associated with NV series for the Indian market. So far, our key-focused segment towards this year & coming years remain the same as before, that is to say, for the Infrastructure & Industrial utilities in the Indian Market. Moving ahead, we will further expand the segments as we have more and better foot hold in these segments.

> Indian lighting industry has been growing around 17 – 18 % throughout the past 2-3 years, and is projected to clock Rs 12,000 crore -15,000 turnovers in the next 2-3 years horizontally, we are quite interested in sharing this market with our confident product range.

Q What are the next steps you have planned? What can the Indian buyers look forward to?

A We will be coming up with new series for indoor application and industrial application, that are ensuring and enabling our customers to enjoy much efficient, green, and energy saving lighting solutions, on which we shall also commit to keep a strong focus on the productivity, safety, and well-being of our customers, 'a sort of the range of the smart, safe, and healthy lighting for the Indian market'. In the past two years, we have helped our customers for the reduction of CO2 emission, totalling 5,000 tonnes per year. We wish to achieve the next target of 10,000 tonnes throughout coming one year. ■

"Always remember, innovation is imperative to remain on top of your business"

Jaquar Lighting is one of the fastest growing lighting companies. It not only offers solutions for residential and commercial, but also for outdoor applications. **Ranbir Mehra, Director, Jaquar Lighting** speaks to Lighting India about the industry and Jaquar lighting taking forward Jaquar group legacy.

How long have you been in this business? We would like to know about the company evolution?

Ans. Jaquar ventured into lighting in decorative vertical but recently revamped and repositioned as a complete LED lighting solutions company in 2016-17. Drawing its inspiration from natural light sources, the lighting company has signed up with Deepika Padukone as a brand ambassador, which identifies with Jaquar lighting brand values of aspiration and style with global aspirations. Today, the company is one of the fastest growing lighting companies having solutions for residential, commercial and outdoor applications. Jaquar's extensive and comprehensive portfolio lets you choose for

varied budgets without compromising on quality and reliability. Whether it's LED Bulbs, Tube Lights, Chandeliers, Landscape Lighting or Track Lights, one can expect Jaquar to offer holistic solution under one roof. Armed with innovative technology like high quality drivers and unmatched services like lighting planning and Pan India onsite assistance, Jaquar lighting is taking forward Jaquar group legacy of trust and customer delight. Recently we have set up a state of the art manufacturing plant for Jaquar Lighting with advanced R&D.

Could you tell us about your process in the product category from start till date?

Ans. Jaquar Lighting is pushing the boundaries of commercial lighting to come up with some of the most advanced, LED energy saving and high-performance lighting systems. We are in three models listed below-

A. For Mass Market (Household consumer products)
B. For projects and B2B Market (Commercial and outdoor product range)
C. Decorative and Chandelier for niche and premium market

3. How do you perceive the current market?

Ans. High quality and energy saving lighting penetration in India is at build up stage. With huge government spending in public sector and mass awareness created, LED market will continue to grow at the pace of 25% for coming 3-5 years.

How has the lighting market changed over the period of time since the company's inception?

Ans. The lighting market is fairly competitive, with local and global brands all eyeing for a share of this fast-growing segment. However high quality complete lighting solutions from a single window is still a big differentiator and which has been the core USP of Jaquar to establish itself as one of the leading brand in this industry.

The lighting sector accounts for about 20% of the total power consumption in India. There is an increased focus towards energy conservation and efficiency thereby boosting demand for LED lights.

India is poised to emerge as the largest market for lighting systems based on LEDs (light-emitting diodes), thanks to the Narendra Modi-led government's UJALA (Unnat Jyoti by Affordable LEDs for All) scheme for replacing all inefficient bulbs with these energy-efficient lamps. The industry witnesses a transition phase from gas discharge solution (CFL, Tubes and HID lamps) to LED products. India, where electricity demand is still an issue, we need to give our country more of energy saving solutions and renewable energy products.

What are your insights about the future of your business (lighting) into this market (current scenario)?

Ans. Jaquar Lighting aims to grow by over three times by the next financial year, taking its current turnover of Rs 100 crore to Rs 350 crore. It is expected to triple its base to Rs 1,000 crore in three years. We have also roped in Bollywood superstar Deepika Padukone as brand ambassador for lighting, which will take forward Jaquar 360 degree campaign across customers touch points. The company draws its unique independent identity taking learning and inspiration from its group legacy of trust and customer delight. The new campaign will focus on targeting these products at young brand-conscious consumers and we will focus on design and build quality to stand out in this competitive market. Moreover, the company has the motto to offer compatible and sustainable LED solutions to the country with professional lighting planner and state of art production facility. Jaquar Lighting has in-house manufacturing for not only international products but we are providing products which are suitable considering India's extreme weather and power conditions. Nowadays, consumer wants a right solution which is matching their needs and our products could be the right choice.

Any piece of advice that you would like to give to the current entrepreneurs in the industry?

Ans. One piece of advice I would offer to young entrepreneurs is that challenge yourself and don't be afraid to take the risk. Always remember, innovation is imperative to remain on top of your business.

Go ahead and follow your dream! ■

First in India

Anil Valia is a respected authority in the lighting field with over 45 years of experience as a designer and formally educated, independent lighting design consultant. He talks about his journey in this industry with Lighting India.

Q What led you to the Lighting Industry?

A In the year 1969, I passed my B.E Electrical (Hon.) from V.J.T.I. Mumbai University. I joined Crompton Greaves Ltd. (Crompton) in their maintenance department. Later joined their Value Engineering department, where there was set up of Silver Plating Plant for switchgear department. As per the trend in those days, I was to go to USA for my Masters in Systems Analysis in Miami University. My friends advised me that I should have Sales work experience for part time job to survive. Based on my request I was transferred to Lighting Division Sales in February, 1971. With my experience in factory I contributed in development of Super Gold Patti, which impressed the top management. They selected me out of 120 sales force to take up the assignment in Head office. Being head of my family at the age of 20, I took a hard decision – not to go to USA and pursue the career in India and decided to join Lighting Division Head office. In Crompton my Parsi boss S.F.Mehta who had just returned from U.K. pushed me to correspondence course on Lighting. Upon completion of same he asked me to appear for Full Certificate Course on Lighting from City & Guilds London, which I passed way back in 1973 and became the first qualified Lighting Educated person in India. This was the beginning of my journey of 45 years in lighting field.

Q What drove you to commence your own company?

A In the year 1986, Philips decided to shift their Head Office to Kolkata and I decided to start my own as Lighting Systems Consultant from my small office in Andheri. At that time Philips was the only company, which was best fit for me as far as technical aspect on Light & Lighting. Going for a job in any other companies (4 major in those days) meant working for them to part with what all I learned. After certain age there is no growth possibility too in such organisations. Further being a Gujarati, business is in our blood. At that time, I had seen that most architects and interior designers were getting free designs from various lighting companies but were not happy when it came to architectural lighting. I felt it will be a niche market where people will be ready to pay and that's it. I started my own consultancy and to the best of my knowledge became the first formally educated independent Lighting designer.

In last 25 years as formally educated , professional independent Lighting Designer & Educator successfully completed several projects, which included Siddhi Vinayak Temple in Mumbai, Swaminarayan Temple at Gandhi Nagar, Reliance Petroleum Main Gate at Jamnagar, Globus Bandra, a Bungalow with Lutron Control in Napeancy road, ABBY's Palace in Pune with Dynalite Control, Asian Paint Signature Store in Bandra with Colour Kinetics USA using LED with Control, Yazoo Park in Virar with Wow effect of Water Body Lighting using Philips CK Underwater Lighting and so on. I guided many suppliers to design & develop Luminaires and accessories, assisted in import of Luminaires from Europe and Far East to market in India with value addition, etc. Many of these successful projects were possible with the help of my daughter Dolly who passed Interior Design Course from Rachna Sansad in year 2000 and turned to Lighting Designer attending several national & international Training courses. In fact, she was instrumental in assisting me in compiling both my books on Lighting with which in fact I was the first to write books on Lighting in India.

Q How has lighting industry evolved in the India?

A When I joined Lighting Industry, it was all small scale industry manufacturing and marketing by large

organisations. It was License Raj. The year 1973, was the beginning of Energy Crises and at that time while working with Crompton Greaves; I had the opportunity to introduce Polystyrene brackets for tube light holders, Industrial Stove enamelled reflector with 7% increase efficiency in fluorescent fitting, Non Yellowing Polystyrene based diffuser against Acrylic diffuser for cost reduction and so on. It was the era of Industrialisation and major buyer was government for Railways, Defense, Roads, CPWD and DGS&D departments and so on. I started my journey with GLS, Tube Light and Mercury vapour lamps.

In Philips era we had the opportunity to work with Halogen, High Pressure Sodium Vapour and Metal Halide lamps and associated Luminaires. In 1981, onward electronic ballast & chokes were introduced which was the beginning of Electronics in Lighting Industry.

As independent Lighting Designer, I started getting projects where FREE Designs were not available or not satisfactory from lighting companies. In the year 1991, with liberal policy import of Lighting Fittings was possible and at that time I had the opportunity to work with several reputed architects using products from European Companies like Zumobel, Reggiani , IGuzini, Simes, Agabekove, iltiluce, Space Cannon, many decorative brands from Murano and so on. From the year 2000 onward we introduced Lighting Control from Zumtobel, iGuzzini, Lutron, Dynalite, Berker B Tichino and many such brands in our projects.

Again from year 2000, the trend was changing to save money and Chinese products were introduced and that was the beginning of closing down of several small scale industries and manufacturing activities in India. Then in year 2002, coloured LEDs came and we used it in Shatranj restaurants at Bandra as marker light imported from UK. In 2004, white LEDs were introduced. This was the beginning of Semi Conductors in Lighting Industry. At that time, I realised that there is a need to upgrade the knowledge to remain leader in Lighting design Consultancy. I then learned about LED in the seminar conducted by LRC Troy in Seoul and visited for the first time LED packaging industry. In year 2005, I was invited in Singapore to make presentation of LED Lighting. We then started introducing LEDs in our several projects and at that time I had the opportunity to interact with several suppliers from abroad as well as visit their factories, interaction during Frankfurt & USA Lighting fairs and so on when I learned a lot about LEDs.

Now it is the era of LEDs and all the light sources will be vanished in coming years. There are several challenges for LED usage and is being resolved by the Industry in steps.

As on date with LED as a Light Source there are several Mashroom Companies doing trading activities, small value addition activities etc. but majority of products are all coming from China and our Lighting Industry has died as far as manufacturing is concerned. This is mainly because LED is not a standalone light source and OEMs have to have knowledge about electronics, Thermal & Optical management etc. with very sophisticated manufacturing equipment and quality control laboratory which is not easy for all small time OEMs. ■

Anil Valia
Lighting Designer
Educator & Consultant

Crescent House

A mirage of tradition and modernism

The Purple Turtles, a Bangalore based store that showcases **Indian Lighting Designers** by providing them a platform for their artistry, shares one of its residential project with **Lighting India** through an e-interview...

Q What is the concept behind this project?

A The house was being designed by Smitha Zacharia of Zachariah x Piers, for a young couple who are very well travelled and were open to experimenting with materials and colours. They wanted to keep the space Indian in its look and feel. Hence, we decided to use brass as a base material combining it with wood, glass, and fabric as per the requirement. We chose Indian patterns and motifs as the elements on upholstery, carpets, and wallpapers.

Q What kinds of lights have you used?

A Most of the lights used are made of traditional materials but contemporary designs. We used chandeliers, drop lights and custom made floor lamps for the space.

Q What were the things kept in mind while designing this house?

A The house was being used by three generations and hence had to do justice to each of their individual tastes and utility. The parents wanted their spaces to be simple, well-lit. Hence the focus was given layering of lights which could be used depending on the function of the space.

We ensured we provided ample light in the bathrooms and also planned to keep the bedsides clear of table lamps to avoid clutter. We added a dove neck reading lamp in addition to the drop lights for extra reading light.

While choosing the lights the architect was very clear that she did not want a single element in the room to grab all the attention, rather her focus was to bring all the elements together harmoniously.

Q What kind of ambient does the lighting provide?

A Fortunately, everyone in the family was okay with using warm light in the entire space. It's sometimes a challenge when clients ask us to design lighting schemes with multiple colour temperatures as per each one's preference. Having passed the first challenge we decided that we will divide the space into entertainment and functional space. All entertainment and common spaces were lit with COB LED lights of 2700k colour temp and all the functional spaces like the study, bedrooms and wet kitchen, utility areas were worked with 3000k panel lights to avoid shadows in the space. We also gave the option to create multiple lighting schemes using drop lights, table, and floor lamps. Since the apartment is on two levels we carefully worked our way into dividing the space such that it was easy for one to transition from one zone to another without feeling the difference in the lighting scheme. ■

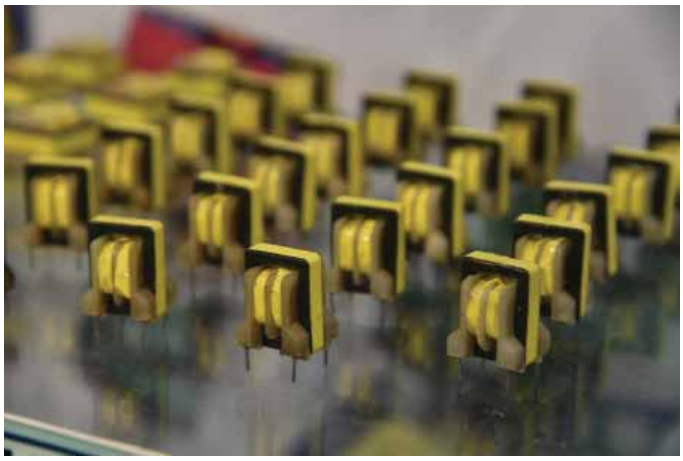
Picture Credits: Zachariah x Piers

LED Expo 2017
New Delhi Beckons You

Full support by the government leads LED Expo to focus on making India energy efficient. The exhibition announces Future Zone promoting Intelligent & Smart Lighting solutions for the nation.

Glimpses from LED Expo 2016

Once at a novice stage, efficient lighting solutions commonly known as LED lights is a market that is now ready take India to a leading spot in the global LED bulb market. The total turnover of the Indian lighting industry was INR 20956 crores in 2016, out of which LED contributed to INR 11399 crores, which is more than 54%. According to recent statistics (according to www.elcomaindia.com), India sells around 770 million LED bulbs per day, clearly projecting that the country will soon become the LED capital of the world (according to www.ledlightsinindia.com/information/led-lighting-market-2017). With India showing such tremendous progress in this sector, LED Expo becomes the most appropriate show that has the potential to offer innovative and efficient lighting solutions to industries of all categories. This exhibition in New Delhi is scheduled to be from 30 Nov – 2 Dec 2017 and is strongly supported by government and industry associations like Make in India, Electronics India, Digital India, Bureau of Energy Efficiency, LACMA - Luminaire, Accessories, Components, Manufacturers Association, Electronic Industries Association of India (ELCINA), Indian Building Congress, and Solar Energy Society of India.



The government has been taking some major efforts to change the lighting practises of the country. It is estimated that LED Lighting will be around 70% of total lighting in 2017 and may be more than 80% by the year 2018 (according to www.elcomaindia.com). This shows that LED lights are slowly making their way out of people's house and are being used on a large scale in commercial and public places like parks, streets, metro stations and parking lots. Supporting the government's initiatives this edition of LED Expo, follows the same agenda on making India more energy efficient by bringing over 290 companies from India and foreign contingents like USA, UAE, China, Germany, Korea, Finland, Italy, Singapore, Taiwan, and Hong Kong to showcase technological advancements in the this sector. Covering 15823 sqm of space, the three day event has always played an important role in bringing the innovators, industry heavyweights and decision makers from commercial and retail sector, town planners, architects, interior designers, government bodies and energy service companies together for networking and business.

Apart from the advanced lighting solutions displayed at LED Expo, this exhibition announces the launch of Future Zone, a platform presenting smart and intelligent lighting solutions to the Indian and international audience present at the event. The platform is geared up to showcase 'next gen technology' like smart lighting, smart switches and controls, wireless keypads, dimmers, decorative lighting and networking devices. In simple words, the lights displayed here will have dimming capabilities and the ability to be controlled by an external network or an app when the person is not in vicinity. Other equipment and 'never seen' before technology in the LED sector are expected to help business visitors get a better idea of the growth potential in the industry. Looking at the present situation where majority of the houses, public and commercial infrastructures are still being operated manually, introducing Future Zone at LED Expo could be a game changer in the energy conservation system of the country.

Trends like smart cities, smart homes, buildings and retail are already penetrating deep in our lifestyle. Keeping the momentum going, the 17th edition of LED Expo will open up opportunities, advantages and a chance of exploring diverse application areas that LED lights can offer to other industries. The nation's foremost exhibition on LED lighting products and technologies will be held in hall numbers 8 – 12A, Pragati Maidan, New Delhi. ■

For more information, please visit http://www.theledexpo.com/

The 15th China Products

(Mumbai India) Exhibition 2017 is on its way

The China Products Exhibition - To Boost Manufacturing and Trading Opportunities for Indian Entrepreneurs

The last few years have seen India emerge as the world's fastest growing large economy with GDP growth rates reaching 7% and above. Thus, the economic focus of the world has gradually shifted towards India and China. By 2030, China and India are expected to be the first and third largest economies in the world, with the largest consuming populations that global companies would wish to attract.

India has a sizeable trade deficit with China and to balance this, Commerce Ministries of both the countries have signed a Five-year Development Programme for Economic and Trade Cooperation to lay down a medium-term roadmap for promoting balanced and sustainable development of economic and trade relations which will give a positive impetus to the India-China bilateral trade.

China has also started investing in Indian infrastructure, industry parks and SEZ sectors with Chinese investments cumulatively rising to $ 1.67 billion till June 2017. Chinese companies have invested mostly in telecom, power, engineering and infrastructure. Several Chinese firms are also in the process of setting up industrial parks. More investments are in the pipeline thanks to low investment restrictions and favourable tax and land rent policies in India.

The 15th China Products (Mumbai India) Exhibition will further assist the escalating bilateral trade by bringing together quality exhibitors to network and interact with Indian entrepreneurs at the Bombay Convention and Exhibition Centre (BCEC), Goregaon East, Mumbai from November 16-18, 2017.

The exhibition has special pavilions for networking receptions, one-to-one business matching for buyers, industry seminars and much more to derive maximum benefit in a more defined and meaningful manner.

Products showcased will range from Hotel Equipment and Supplies, Consumer Electronics, Home Appliances, Household products to Furniture and fixtures, LED and Lighting products, Fashion Jewellery, Apparel and Textiles to Machine Tools, Industrial goods, Building material and equipment, etc.

The exhibition is organised jointly by The China Council for Promotion of International Trade (CCPIT), CCPIT Guangdong Province Committee, CCPIT Commercial Sub-Council and Worldex-SingEx Exhibitions (Guangzhou) Co., Ltd.

The exhibition is co-organised by Hong Kong Trade Development Council (HKTDC), Macao Trade and Investment Promotion Institute, Department of Commerce of Guangdong Province, Sichuan Province Committee CCPIT and managed in India by Worldex India Exhibition & Promotion Pvt. Ltd.

The China Products (Mumbai, India) Exhibition has been endorsed and supported by leading trade bodies in India including the All India Association of Industries, India-China Chamber of Commerce and Industry, Indian Merchants' Chamber, SME Chamber of India and the Consulate General of the People's Republic of China in Mumbai.

To access a world of opportunities and take the next step towards global expansion, visit the 15th China Products (Mumbai India) Exhibition. For further details please log on to www.chinamumbaiexpo.com ■

Glimpses from 14th China Products (Mumbai India) Exhibition 2016

High-Performance Backyard LED Basketball Court Lighting

Access Fixtures launches new backyard LED basketball court packages. These packages provide everything you need to light a backyard basketball court to an average of 10-19 footcandles. Designed for backyard-level play, these LED basketball court packages are designed for courts that are 30' x 35'; if your court is a different size, Access Fixtures can modify all packages to suit your requirements.

Each package comes with up to four KOTA sports light fixtures that emit 20,324 lumens each. These fixtures auto-sense voltages between 120v and 277v; high-voltage wiring is also available, Access Fixtures can easily customize your fixtures to ensure you achieve the best output. Each backyard LED basketball court package uses KOTA LED sports lighters that feature a single multi-layer Luna Flip Chip COB LED, which far outperforms lamps with multiple chips due its reduced thermal resistance and lower operating temperature. With their unique COB DBR flip chip design, KOTA LED sports lights solve heat issues via a built-in channel that helps heat escape before it harms the LEDs. As a result of this unique feature, each KOTA sports light has a rated of life of up to 100,000 hours, delivering a terrific amount of light. ■

Website: www.accessfixtures.com

Chroma-Q introduces the New Inspire XT

The award winning Chroma-Q Inspire range welcomes its newest and eagerly anticipated addition: the Inspire XT. Incorporating all of the features of the popular Inspire range of luminaires, including; fully homogenised beam, theatrical grade dimming and convection cooling, the new Chroma-Q Inspire XT boasts an impressive output of more than 9,500 hot lumens.

The Inspire XT uses Chroma-Q's advanced homogenised optics, allowing for a single output beam that is clean, pure and uniform. Factory calibration ensures every Inspire's output is color matched.

The Inspire XT's range of beautiful whites, soft pastels and bold saturates provides for maximum creativity. Its ability to transform the look and feel of a space and engage an audience while subtly or boldly shaping an environment makes Inspire XT perfect for entertainment, Houses of Worship and architectural projects.

The XT is twice as bright as the industry leading Inspire and uses DMX, allowing the fixture to dim smoothly through the entire range, especially at low levels. In addition to being energy efficient, the Inspire XT is a low maintenance fixture delivering over 50,000 hours of life expectancy. Camera Friendly technology eliminates camera flicker, on even the most demanding HD camera.

The Inspire XT rounds out the product range, which includes both the Inspire and Inspire Mini, for a complete house lighting solution.

Inspire XT Additional Features:

- RGBW colour mixing provides a CRI of up to 90 and delivers extremely accurate colour mixing
- DMX-512 Control allows for individual fixture control and pixel mapping to create gorgeous colour effects and warm amber looks to engage and captivate the room ■

Website: www.chroma-q.com

Breakthrough in Emergency Lighting Technology

The advent of LED has revolutionised many aspects of the lighting industry, not least the need for constant maintenance of luminaires with lamp changing in fluorescent and HID luminaires rapidly becoming a thing of the past resulting in significant cost savings for estate maintenance. Battery technology has however lagged behind LED development, as a result of which emergency luminaires have remained high maintenance products which may potentially require several battery changes over their lifetime resulting in significant cost, not to mention the environmental cost of battery disposal.

Designed to complement mains operated luminaires, the Dextra LED4 is a standalone non maintained emergency luminaire and is available in standard, self test and autotest emergency variants. All luminaires are supplied complete with a range of easily changed lenses for open area, escape route and spot applications ensuring that a single luminaire can be installed across any project and the lenses changed as and when required to provide the required light distribution.

The Dextra LED4 also incorporates Lithium Iron Phosphate technology; this battery provides excellent energy density and lifetime with far superior stability than Lithium Ion ensuring peace of mind in safety critical applications such as emergency lighting. The LED4 is supplied with a three year battery warranty and offers greatly extended lifetime when compared to Nickel Metal Hydride and Nickel Cadmium battery technologies, reducing maintenance costs over lifetime and improving the reliability of your emergency installation. ■

Website: www.dextragroup.co.uk

Eaton launches Zero 88 FLX S lighting consoles

Eaton expands its award-winning Zero 88 FLX range with two powerful, all-new lighting control consoles designed for applications where space, time, ease of use and flexibility are key factors. FLX S24 and FLX S48 are affordable, easy to use and fun. They control 48 and 96 fixtures respectively to bring the power, simplicity and cost-efficiency for which Zero 88 are renowned. Recognising that programming time continues to become ever-tighter and more precious, Zero 88 has streamlined key elements of FLX S to assist with all the prep work, getting the user ready to operate even quicker.

'RigSync', nominated for a PLASA Innovation Award later this month, keeps FLX S fully synchronised with the lighting rig, without any need for the user to understand DMX or even think about patching. 'Guidance' helps the user through key features of the console, allowing them to learn and refresh their skills at their own pace. Colour is at the core of the operating architecture, providing quick and accurate control of colour changing fixtures via the four encoder wheels and the 7" multi-touch display - offering Zero 88's award winning colour and image picking interfaces and access to "Mood Boards by LEE Filters". Moving lights can be intuitively controlled using the multi-touch pan / tilt grid or the encoder wheels – hugely popular and familiar to the majority of console operators - or by applying automatic movement effects such as 'figure 8', 'rainbow' and 'fly-in'.

For speed, convenience and familiarity, regular functions have dedicated buttons rather than 'soft' unlabelled buttons that keep changing, and there is a Master GO button for theatrical style Playback. Free apps for iOS and Android are an integral part of the overall FLX S package. Tablets act as wireless touchscreen monitors, while smart phones act as remotes, providing wireless control of the rig and allowing the user to manipulate, control and playback their shows. Apple Watch users can also benefit from using their device as a focus tool.

Enhanced connectivity includes two USB ports, an Ethernet / networking port, both 5 pin and 3pin DMX outputs, and for FLX S48, an external monitor. Both consoles are available in either one or two universe versions out of the factory, or with the option to upgrade easily online after purchase.

FLX S presents two extremely compact and lightweight control solutions with tidy footprints which are ideal for touring, travelling or fixed installations. FLX S24 has been built to fit within a 19" rack enclosure.

The FLX S range is designed for universal appeal, and is manufactured in the UK by Zero 88 - bringing 45 years of professional entertainment manufacturing expertise. It is especially suitable for fringe theatre productions, education, community venues, houses of worship, corporate events and presentations, concerts, rental applications, fashion shows, festivals, holiday parks and themed attractions, cruise ships, television and many more. ■

Website: www.zero88.co.uk

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Venue: Pragati Maidan
Date: 30 November - 02 December, 2017
Website: http://www.theledexpo.com/index.html

Light-Tech Expo Tokyo

Venue: Istanbul Expo Centre
Date: 17-19 January, 2018
Website: www.light-technology.jp

Light India International

Venue: Bombay Exhibition Centre, Mumbai, India
Date: 19 - 21 January, 2018
Website: www.lii.co.in

Light + Building 2018

Venue: Frankfurt Fair and Exhibition Centre, Germany
Date: 18-23 March, 2018
Website: www.light-building.messefrankfurt.com


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(LxWxH): 360 x 30 x 21 [mm]

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BAG NCD (Non-Isolated) Series 400mA - 800 mA - 70W - 100W 4 Products

(LxWxH): 280 x 30 x 21 [mm]

(LxWxH): 280 x 30 x 21 [mm]

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