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# IllumiNation

JULY 2019

THE LIGHTING MAGAZINE

## BOGIBEEL BRIDGE IN ASSAM GETS THEME-BASED ARCHITECTURAL ILLUMINATION FROM BAJAJ ELECTRICALS



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HIGHLIGHTS OF NEXT ISSUE

- Chat Time with Avinder Singh
- Reminiscences of 50 years of ELCOMA
- Wall of Fame
- Report on BRICS meeting at Beijing
- Report on LVDC conference
- Profile : Mohit Sharma



## RENEWABLE ENERGY FOR NEW INDIA

**T**his new issue is full of energy. By energy I mean renewable energy. Seeing the importance of renewable energy and its implications to the future of our country and its business environment, from this issue onwards, we have added sections focusing on solar and other non-grid energy sources.

Government has already taken big steps in providing power to non-electrified areas using new and renewable energy and has an aggressive target of generating over 175GW of solar and renewable power annually in the coming years. This will not only address the power needs of our fast growing nation, but also reduce our carbon footprint drastically and eventually allow us to move away from polluting fossil fuels.

There are number of government projects, programs and activities to enable the propagation of renewable power sources and EESL is playing a very important role in not only electrifying many rural, urban and semi-urban areas but also providing solar streetlights in the heartland of India.

Under Ministry of New and Renewable Energy (MNRE) initiatives, EESL is installing lakhs of Off-Grid and Decentralised Solar Street lights in villages under the Atal Jyoti Yojana (AJAY) and has also distributed millions of solar study lamps at a nominal cost to students in villages. This issue not only covers these programs thorough an article penned by Mr Venkatesh Dwivedi, Director (Projects), EESL but also several other articles and thoughts of Industry leaders on the impact of renewable energy on the India of the future.

We would like to also remind our readers that the ELCOMA-IEC conference on LVDC is coming up on 9th August 2019 in Delhi and urge you all to join us in learning about this paradigm that could change the complete Lighting industry as we know it and will impact the products, components or standards of the future.

I hope you will continue to enjoy our magazine "IllumiNation" and would love to receive your feedback on this issue at [nikita@elcomaindia.com](mailto:nikita@elcomaindia.com)

Best Wishes

SHYAM SUJAN  
Secretary General  
Electric Lamp and Component Manufacturers Association of India (ELCOMA)



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## WIRELESS TECHNOLOGY IS HERE

The Indian Lighting Industry in 2018-19 has grown by 6% while the LED Lighting segment has grown by 47%. There is also a major shift from conventional to LEDs with a 49% decrease in conventional lighting from last year. This trend is expected to continue for another two years when the entire lighting industry is likely to convert to LED based Lighting

India has been the fastest in the world to adopt and accept LED Lighting. CFLs are almost extinct in India while there are still many countries where CFL is still the main lamp for lighting. Experts predict that India will convert entire Lighting in India to LED in another 2-3 years while there are so many other countries which are probably going to take another 6 to 8 years for the same.

India is also at the forefront of accepting and adapting new technologies in all applications. With 100 smart cities underway, wireless technology will be extensively used for all kinds of communication. The government is trying to provide all services, security and facilities through a single smart lighting pole. This pole may consist of LED streetlight, security camera/s, public announcement systems, fire / emergency alarm system besides delivering social messages through a small screen and a host of other services on this single pole. ELCOMA members have already geared their organizations to deliver products and services for these applications which is expected to bring a sea change in the way public safety, security and lighting is perceived in the country.

Another wireless application that India will adopt in the near future at a large scale will be app based monitoring and management of the lighting system of our homes. These mobile based control panels will allow end users to remotely switch off, switch on, control, change the colors and appearance or hue as per mood of one, more than one or all lights in their homes from anywhere. These control systems will also allow users to manage not just lighting but almost all the appliances at their homes.

Presently these technologies are expensive due to limited demand. But we can see that this change is happening at a very fast pace. Once these applications are manufactured in bulk and adopted en-masse, the prices will definitely be more affordable.

The Lighting Industry in India has to adopt wireless technology immediately and incorporate it within all their products. The wireless world of tomorrow will be more reliable, efficient and intelligent and we need to be there to support it.

A handwritten signature in black ink that reads "Raju". The signature is stylized and written in a cursive-like font.

RAJU BISTA  
President, ELCOMA





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A portrait of Sanjay Gupta, a middle-aged man with grey hair and a mustache, smiling. He is wearing a dark blue suit jacket, a light blue shirt, and a red patterned tie. The background is a plain, light grey wall.

**WE ARE READY FOR  
SMART AND CONNECTED LIGHTING NOW**

*Sanjay Gupta, Senior Vice President, Consumer Lighting & Switches, Wipro India Limited  
shares his thoughts on Smart and Connected Lighting with IllumiNation*

**Wipro is considered a serious player in the Connected Lighting space. What are the opportunities afforded by Connected Lighting?**

India is growing at a fast pace with urbanization transforming the country. Lighting is important in urban development and helps cities and localities become safe and smart. New technologies in lighting are contributing immensely to make commercial and residential campuses and buildings safe, efficient and smart. Wipro Lighting is a pioneer in providing comprehensive Smart and Connected lighting solutions on the platform of Internet of Lighting (IoL™). These lighting solutions are based on Power over Ethernet (POE), Bluetooth Low Energy (BLE), inSync™ - Human centric lighting solutions, LiFi and smart city solutions.

The company is thus providing its applications and solutions right from smart homes, smart buildings to smart cities under the brand identity of Internet of Lighting (IoL™).

Wipro Offers a range of energy efficient lighting solutions, control systems and components for smart lighting applications utilized in Indoor and Outdoor facilities.

**Q. How do manufacturers plan to support connectivity in lighting systems and LED drivers?**

Wipro has planned to make its offering robust through its inherent strength in innovation and technology and its partnerships with international technology companies.

Wipro has been a pioneer on the technology front in this field. Having said this we are well equipped with state of the art facilities for driver design, testing and manufacturing and this helps us to develop the much needed base to adapt to Smart and Connected technology. We are also equipped with NABL accredited Photometry testing lab.

We have also partnered with international technology companies like Cisco, PureLiFi and Igor, UK for POE and smart nodes. With all this we are fully equipped to support connectivity through end to end smart lighting

solutions to our customers under our Internet of Lighting (IoL™) platform.

**Q. What are the benefits of connected applications?**

Smart and Connected Lighting offers a blend of efficiency, comfort and style with focus on intelligent controls for Cost, Convenience and Comfort. It plays an important role in making workplaces more productive, at the same time making them more economically sustainable. Smart and Connected Lighting systems can be seamlessly integrated with building management systems and have a customized GUI for ease of operation and control providing personalised lighting for enhanced comfort with individual luminaire level controls for intensity, color and energy management. All this is for both indoor and outdoor applications.

Increased employee concentration, cognitive performance alertness and general well-being are some of the advantages of connected applications. Connected lighting systems also offer significantly greater security, data speed and densities to support more robust and reliable wireless networks that complement and enhance existing cellular and WiFi networks.

**Q. What kind of obstacles do you see for such connected products in India?**

Currently in our assessment we see affordability as the only obstacle especially in cases of tight budgeted projects. Customers are keen on usage of Smart and Connected Technology. With time, the need and thus the acceptance is growing. Once the technology gets popular and usage increases, the costs will get rationalized, thus improving affordability and feasibility for all the customers. We are already seeing this happening at a rapid pace.

**Q. How does Connected Lighting effect illumination delivery?**

Through our Internet of Lighting (IoL™) platform we are able to control lighting systems through GUI based applications. This means that we are able to keep a close control on light output (Lux levels), energy

*“Connected lighting systems offer significantly greater security, data speed, and densities to support more robust and reliable wireless networks that complement and enhance existing cellular and WiFi networks”*

Sanjay Gupta  
Senior Vice President, Consumer Lighting & Switches  
Wipro India Limited

*“Customers are keen on usage of Smart and Connected Technology. With time the need and thus the acceptance is growing. Once the technology gets popular, and usage increases, the costs will get rationalized, thus improving affordability and feasibility for all the customers”*

Sanjay Gupta  
Senior Vice President, Consumer Lighting & Switches  
Wipro India Limited

saving and management and driving human centricity through change of color of light and intensity. We can also achieve individual luminaire level control. On illumination delivery, connected lighting offers personalized user control, performance tracking with real time updates on lighting systems status.

**Q. Can you give some examples of Products/Serves/Verticals where Wipro would be focusing their Connected Lighting product portfolio?**

We drive our business through segments – Modern Workspaces, Industry, Infrastructure Projects and Outdoor. Through the Internet of Lighting (IOL™) platform we have developed range of products suitable for all these segments.

Wipro Lighting has a wide range of energy efficient lighting solutions for smart lighting applications to serve the undergoing radical changes in Smart indoor and outdoor with Smart Cities coming up. Smart cities is an important mission for the Government of India. The objective is to enhance the quality of living for citizens through superior and efficient use of technology and lighting solutions and our aim is to address the premium lighting requirements in all the

segments through our wide range of smart and connected lighting solutions.

**Q. What timeframe do you see these kind of applications becoming a reality in India?**

We being the pioneers in Smart and Connected Lighting, are already experiencing this becoming a reality in India. India is witnessing the technology revolution in all aspects - be it communication, infrastructure or development or in our daily lives, technology is playing a vital role in all these areas. On the same lines, we see the Smart and Connected Lighting revolution has already begun, and thus we are geared up to deliver value through range of Products under the IOL™ platform.

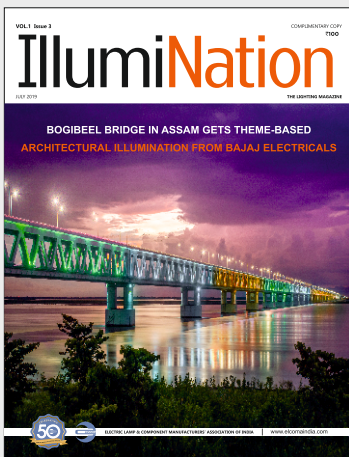
We already have installed our Smart and Connected Lighting in various Indoor and Outdoor applications across the country.

We have recently been awarded with the 2018 Frost and Sullivan Connected Lighting Company of the Year.

To summarize on the timeframe front, Smart and Connected Lighting is here and now, and we are ready.

**Author: SANJAY GUPTA**  
Senior Vice President, Consumer Lighting & Switches  
Wipro India Limited

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**“Since childhood, politics has always been a topic of interest for me, but I had never imagined I would be flung into the political world so early in life”**

*Raju Bista, Managing Director, Surya Roshni Limited*  
talks about his journey into politics and the future of Indian Lighting business with IllumiNation

**Q. At this early age, you have come a long way and reached great heights in the corporate world – you are the Managing Director of Surya Roshni Ltd and managing Surya Foundation, an NGO, as well. Talk us through your journey so far.**

Having joined Surya family at an early stage, I was fortunate to be mentored by none other than the founder, Shri J. P. Agarwal himself. During my initial years at the foundation, I traveled extensively with Mr Agarwal and watched closely his passion for work and strong business ethics. Working with him was not just about learning the ropes of business development and resource management, but also helped me to inculcate strong values, principles and business ethics.

Under Mr Agarwal's guidance, we launched various social initiatives on education, youth development, health and yoga, mainly focusing towards the rural areas. We strongly believe that business is not just about profits and growth, but more about the social value and opportunities it can generate. It is this holistic approach to our business that ensures that everyone in Surya today is a close-knit family, be it the workers in our factories, children in schools, professionals in offices, youths at the foundation, volunteers on the field, or their families.

At Surya, we are committed to our business, society, and the nation at large. It is this vision that guides and inspire us out the best in us.

**Q. Recently you have entered politics. You contested and won a seat in the 2019 Lok Sabha elections. How did you get interested in politics?**

Working closely with Shri J.P. Agarwal, I have been fortunate to travel with him and participate extensively in social engagements which provided me with exposure in both social and political domain. Sh. Agarwal's reputation as a grassroots social worker, philanthropist and extensive network has helped me get a good understanding of politics and the direction in which our nation was moving.

Since childhood, politics has always been a

topic of interest for me, but I had never imagined I would be flung into the political world so early in life. While the elections for Lok Sabha 2019 had already been announced, one day, out of the blue, I was invited to the BJP office and underwent a long and thorough interview by a panel of senior party functionaries who then asked me to join BJP and also to contest Lok Sabha elections from Darjeeling Parliamentary constituency. This was on 24th March, 2019.

Next day, I took an early morning flight and arrived at Darjeeling to file my nomination. I was received at the airport by senior BJP leaders from the constituency. As I stepped out of the airport, there was a huge crowd waiting outside the airport with garlands, banners and placards. I felt the real might of the elections right there as the procession began from the airport and towards the registrar's office, amidst heavy cheering and sloganeering. I could sense people's love for BJP and Narendra Modi ji as they welcomed my arrival.

As my candidature was announced at the last moment, the election campaigns began immediately after my nomination papers. The next few weeks were grueling, both in terms of the physical and mental demands on me. Travelling, interacting with local people, understanding their issues, we visited places which we couldn't have imagined before. It did not take much to lose track of time and of meals, since meetings and gatherings were organized every day and I seemed to be moving from one public engagement to another. Looking back, I think that the conviction and belief that I was doing this so that I could make a difference to the lives of millions, was what kept me going through this hectic few weeks and months. I am also extremely thankful and grateful to all my friends at Surya who supported me throughout the elections, both morally and physically.

One of my most beautiful memories of the election campaign was to receive honorable PM Sh. Narendra Modi at Siliguri. He had come all the way to address the people and

*“Although my role as a politician is totally different from the role I have in Surya, I am naturally a lighting industry professional. I will always want to do everything that is possible to promote the Indian lighting industry on national and international platforms”*

Raju Bista  
Managing Director  
Surya Roshni Limited

personally vouched for me in public. For me personally, it was a humbling moment and perhaps his good wishes also worked during the results. By the end of the elections, we were almost certain of winning, but were not expecting that I would win by over 4 lakh votes, the highest winning margin in all of West Bengal.

**Q. Recent reports on the Indian Lighting Industry for the period 2018-19 indicate that LED Lighting has grown by 47% but overall Lighting, including conventional lighting, has grown by only 6%. There is also a major shift from Conventional Lighting to LED by about 49%. Do you think this trend will continue? Is there any likelihood that there will be 100% shift to LED Lighting in the near future?**

It is not unusual that whenever a new technology disrupts the market, the old players have no option but to upgrade themselves. Take for example when we introduced CFL, the conventional incandescent lamps market took a nosedive as CFL overtook the market. CFL bulbs were initially priced at about Rs. 550 in 2003-2004 but came down to less than Rs. 100 within a couple of years. When the market volume increases, manufacturing cost comes down and the benefit is passed on to the consumers as well.

The same is the case with LED Lighting market right now. The market volume is growing much faster than any other technology, thus bringing down prices as well. We can safely assume that in another 2-3 years, LED lights will completely dominate the marketplace.

**Q. It is observed that prices of LED Products are eroding and the industry is facing heavy competition within itself. Do you think the industry will be able to sustain it in the long run? Is there any chance that in near future the prices will stabilize and Industry will settle down?**

As I said above, the market forces play a very important role during such situations. Around 2004, when CFL dominated the market, there

were around 60 manufacturers. The number reduced to only about 15-16 brands by 2007. Similarly, there are more than 400-500 LED lighting manufacturers or assemblers at present. The market will stabilize in another 2-3 years and only those who can sustain the price pressure will survive.

**Q. Many new entrants have joined the Indian Lighting Industry and are continuously creating challenges for the older and established brands including Surya Roshni. Do you see any threat to your brand from some of these new players? How do you plan to face this challenge?**

Yes, with 35% of market dominated by unorganized manufacturers, we will continue to feel the pinch for a while. These unorganized manufacturers are only here for quick profits and are least bothered about quality of their products. They will continue to pose challenge for a while, not just for Surya but to the whole Lighting Industry as well. But, in the end, it is the trust and quality of the brands that will emerge as winners from this disruption.

**Q. Your recent entry into politics is welcome news for the industry. Do you think you will be able to help the Lighting Industry in containing some of the issues that are troubling smooth operations, like unauthorized market and poor enforcement, price erosion, GST reduction etc? If yes, what kind of actions would you plan to address these issues?**

Although my role as a politician is totally different from the role I have in Surya, I am naturally a Lighting Industry professional. I will always want to do everything that is possible to promote the Indian Lighting Industry on national and international platforms. With the business-friendly government at the center, I hope there will be good times ahead for all Indian industries. The government is already working towards streamlining the GST processes and has shown great commitment to promote Indian manufacturing industry with schemes like 'Make in India'. Even as a Member of Parliament, I will continue to speak

*“Even as a Member of Parliament, I will continue to speak for the industry and provide my inputs wherever necessary”*

Raju Bista  
Managing Director  
Surya Roshni Limited



for the industry and provide my inputs wherever necessary.

**Q. What are the new areas of growth identified by Surya Roshni?**

Our venture into the home appliances segment with Surya fans, kitchen accessories and electrical goods is part of our long-term strategy to diversify our product lines. We will continue to research and invest in technology and production of top-notch, quality products. We want to be able to provide quality products at an affordable price for our consumers across the world.

**Q. What is the vision for Surya Roshni in lighting for the next few years?**

We did a business of Rs.1000 crores in just LED products, out of our total earnings of Rs.1600 crores in 2018-19. In the next 3 years, we expect to grow our revenue from LED products to Rs. 2400 crores. We are looking forward to increasing our sales in appliances and kitchen segment as well in the coming years.

**Q. What has been the impact of large government program like UJALA/DELP, SLNP etc on the industry and Surya in particular?**

One of the government's biggest achievements was the complete electrification of the country. With electricity reaching every home, the lighting manufacturing industry will continue to benefit from the increasing consumer base. From the conventional incandescent lamps to LED, the Indian consumer has also quickly adapted to energy-efficient LED products. Globally, India ranks second after China as the largest user of LED lamps and streetlights. So yes, as partners in the economic growth of the country, it is not only Surya, but the industry as a whole stands to benefit from this.

*“...unorganized manufacturers are only here for quick profits and are least bothered about quality of their products. They will continue to pose challenge for a while, not just for Surya but to the whole Lighting Industry as well. But, in the end, it is the trust and quality of the brands that will emerge as winner from this disruption”*

Raju Bista  
Managing Director  
Surya Roshni Limited

Author: ILLUMINATION EDITORIAL BOARD

## IN A LIGHTER VEIN

**Q. What is the meaning of relaxation for you?**

I have always found travelling to be therapeutic. It is not just about the place you visit, but also about experiencing different cultures, their food and meeting new people. When I am at home, I begin my day with Yoga, meditation and an elaborate Puja. This practice provides me the positivity and strength to better myself every day.

When I am not working, I like watching movies with my kids and family. Ours is a huge family with a bunch of kids around. Just watching them play is quite relaxing as well.

**Q. Are you a family man? If yes, how do you spend time with your family?**

Yes, I am a complete family man. No matter how busy I am, I try my best to take some time out for my kids and family. I feel it is important that you attend to them, talk, or watch a movie together. I take my kids to the malls on holidays to shop and play. As a family, we also make sure to go on a vacation together at least once in a year. It is important to strike a balance between profession and personal life.

**Q. What is your mantra of keeping your employees happy?**

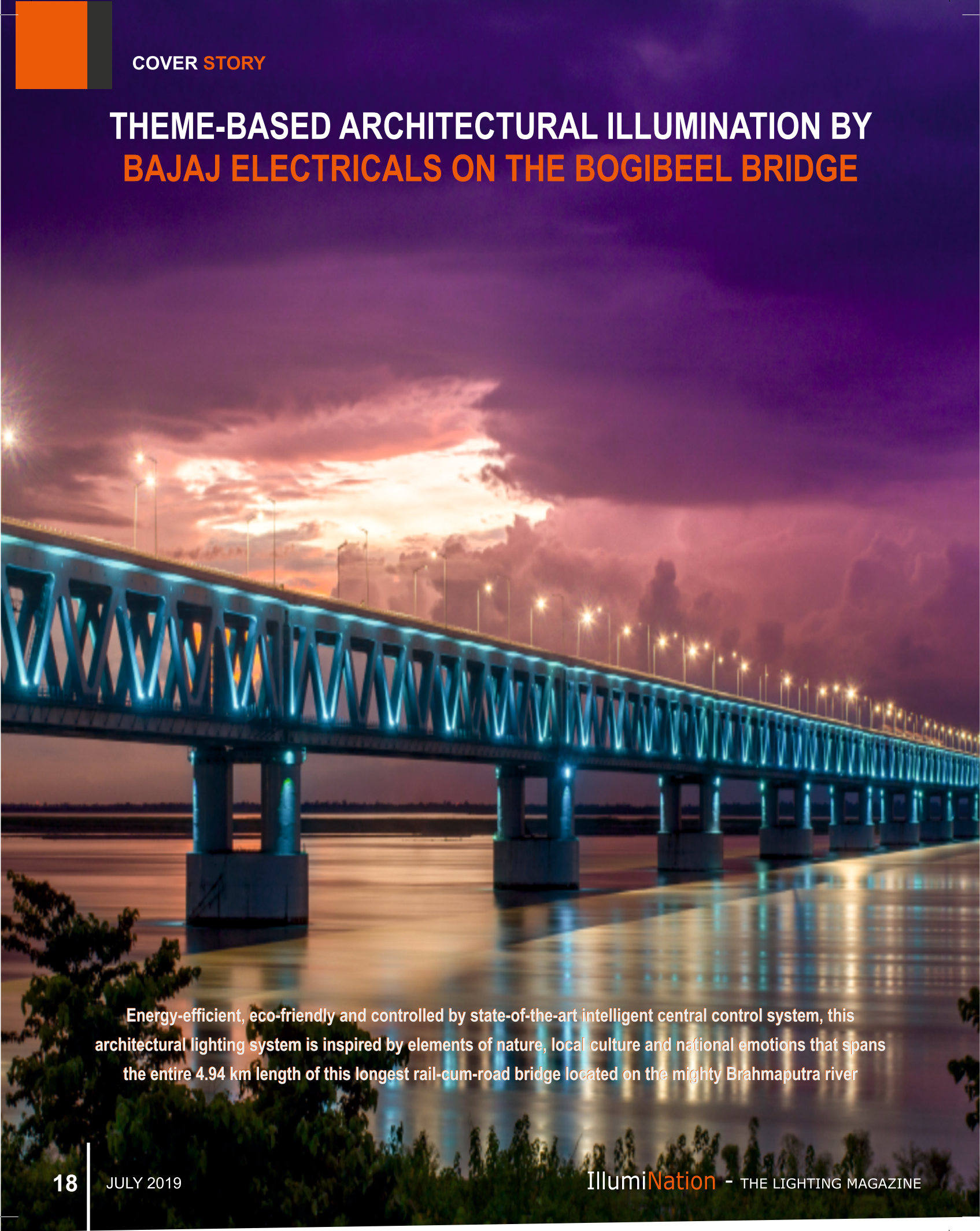
I believe that it is important to have a team for long-term success. My office is an open platform where you need not even knock to get inside. Anyone can walk up to me anytime, right from the CEO, my office staff, or my driver.

I like to task my employees with new challenges, with opportunities for new learning and knowledge enhancement and I constantly keep them engaged at a personal level too. For me, it is more about building a relationship and working towards enriching each other's experience.



COVER STORY

# THEME-BASED ARCHITECTURAL ILLUMINATION BY BAJAJ ELECTRICALS ON THE BOGIBEEL BRIDGE



Energy-efficient, eco-friendly and controlled by state-of-the-art intelligent central control system, this architectural lighting system is inspired by elements of nature, local culture and national emotions that spans the entire 4.94 km length of this longest rail-cum-road bridge located on the mighty Brahmaputra river

Bogibeel Bridge is India's longest rail-cum-road bridge and is situated on the Brahmaputra River in the state of Assam. It is Asia's 2nd longest rail-cum-road bridge and has a serviceable period of about 120 years. Spanning over 4.94 km, the bridge is of strategic significance to India due to its connectivity to the north-eastern border.

This bridge was one of the dream projects of India's former Prime Minister, Bharat Ratna Late Shri Atal Bihari Vajpayee, who laid the foundation of the bridge in the year 2002. The bridge was formally inaugurated by the Hon'ble Prime Minister, Sh. Narendra Modi on Atalji's birthday, 25th December, 2018.

Bogibeel Bridge has 39 spans of 125 meters each and a superstructure of composite welded steel truss and reinforced concrete. Being an architectural site and a sign of prestige, the illumination project is designed with utmost care by the Lighting Design team at Bajaj Electricals. It is designed to enhance the visual appeal which symbolizes the cultural roots of the nation. One of the key features includes minimised power consumption, thus making this whole lighting scheme very energy-efficient and eco-friendly. With the thought of syncing the culture and emotions of people, the lighting designers at Bajaj Electricals Limited conceived the entire project to capture hues of colours and dynamics of the local festivals.

#### PROJECT OVERVIEW

Controlled by state-of-the-art intelligent central control system, the entire architectural lighting system runs on universal DMX 512 protocol. The complete power supply & control system circuits are optimally designed to suit the extreme outdoor environment of the riverbed. Largely, the system involves single type of luminaire which maintains the consistency in the appearance of all luminaires across the entire bridge facade. The luminaries are optically supported with precise beam angles, ensuring minimum spray of light to the surroundings, thereby minimising light pollution.

With an aim of simplifying the procedure to

install, maintain and control the overall system, the mounting of luminaires, junction boxes and cable routing were judiciously designed at feasible locations. Mounting the structure with low wattage compact sized outdoor grade LED luminaires helped illuminating only the intended structural elements. Approximately, 1100 numbers of 48 watt luminaires were used to illuminate the structure. Below the main superstructure, pylons are supported at a spacing of 125 m which are also illuminated as part of the project. These, in turn, impart modularity to the illumination design.

The lighting design was supported by powerful 3D simulations to create and visualize the light choreography before it was installed on site. True scale virtual 3D models were made and the light effects were simulated beforehand, by the placement of true-sized luminaires on the models and using actual luminaire photometry. The process was time-consuming, complicated and iterative which ensured perfection during execution. The site engineers and designers of Bajaj Electricals made a well-coordinated effort to ensure the precise installation of the whole illumination structure which then led to the creation of a symphony of magical lights.

#### COLOUR THEMES FOR BOGIBEEL

In addition to the other features, the distinctive use of tuneable RGB LED fixtures led to the possibility of creating multiple scenes and themes. Feeding the control signal from both ends of the long bridge imparts a certain redundancy to the entire system. The system is loaded with pre-programmed and well-designed themes. Theme activation is done automatically from the controller with the help of its inbuilt astronomical time-clock. Additionally, the system also offers options for easy re-programming at any occasion. This is made possible through non-volatile solid state memory/ memory card. The entire illumination scheme is designed with colours and patterns inspired from elements of nature, local culture and national/ global emotions. The system follows the seasonal variations in sunset/ sunrise timings.

*“The bridge today is not only a mode of connectivity and relief to the locals, it is also a site for tourist attraction with Bajaj Electricals' captivating architectural illumination system”*

There is a daily day-to-day theme which runs with changing gradient of colours which starts at dusk-time with warm sunset mode and ends at late evening with a cooler and darker night mode. There is a short multi-coloured dynamic show which is scheduled to run daily at half an hour time intervals. The execution of this dynamic show is done by Bajaj Electricals' team of experienced engineers and lighting designers. Presently, the programmes are set for the dates of year 2019 and can be re-programmed/ re-scheduled for different dates in coming years.

With the aim of honouring natural serenity & perpetual dynamics of the flowing river, the main theme of the daily programme – 'Theme Brahmaputra' captures the soul of the river, where the entire gigantic structure becomes an impersonation of the flowing river. It is also designed for special days which include various local and national socio-religious festivals, commemorations, birth-anniversaries of eminent personalities, some commonly observed UN (United Nations) specified global days etc.

Bihu is the most popular and widely celebrated local festival in Assam and is associated with the traditional Bihu dance,

which is captured in the typical 'Muga' yellow and Red colour. The colours and the rhythmic movement of Bihu dancers are perfectly represented in the 'Bihu' illumination theme which is applied during the festival. Other attractive themes include the 'Jaapi' which represents the colourful traditional Assamese hat, 'Kapouphool' which is the popular purple and pink orchid used for decoration and ornaments in traditional Assamese culture. Several Tri-colour flag themes are also programmed to sync with National days and other events of national pride like winning a revered sports tournament or receiving any kind of international accolade for the country, etc.

The Bogibeel Bridge on the Brahmaputra is the maiden imprint of human civilization in a remote rural landscape where the mighty river has an engrossing presence.

Bajaj Electricals has strived to keep the essence of this structural pattern in illumination designs and turned this pattern into a pleasing and attractive aesthetic rhythm. The bridge today is not only a mode of connectivity and relief to the locals, it is also a site for tourist attraction with Bajaj Electricals' captivating architectural illumination system.



#### BAJAJ ELECTRICALS

Bajaj Electricals Limited is a company with a deep legacy of over 80 years that enjoys the status of being one of the most trusted and respected companies in India. It is a core part of the "Bajaj Group". Bajaj Electricals is one of India's Leading Consumer Products and EPC companies. Its business comprises: Consumer Products (Appliances, Fans, Lighting) and EPC (Illumination, Transmission Line Towers and Power Distribution). The company also has a strong presence in the premium range of home appliances and cookware with brands like Morphy Richards and Nirlep respectively.

Bajaj Electricals did a turnover of Rs 6,744 crores in FY'18-19 and has an employee strength of over 3,000 employees. The company has 20 branch offices and services more than 2,00,000 retail outlets on a weekly basis. The company also has over 500 consumer care centres, spread in different parts of India besides being supported by a chain of Distributors across the country. Bajaj Electricals Limited has also set up offices in regions such as Africa, Middle East and China in order to extend its global footprint.

# LED PACKAGE REVENUES STAGNATE AT 3%

Several factors have led to the rapid price erosion of LED packages affecting revenues of all major LED package manufacturers

2018 was a very difficult year for most LED manufacturers. The LED packaging industry was weighed down by excess inventories and the US-China trade war caused demand (and as a result production) to stagnate. And when you add several new 'boutique' LED manufacturers with idle capacities to this mix, you have a full blown price erosion war that is eating into the revenue growth of LED manufacturers.

Though these factors led to a very tepid year in terms of business performance for LED manufacturers, 2019 is proving to be an even more challenging year with every LED package manufacturer aggressively targeting customer acquisition at any costs to liquidate large inventories. In some cases, product prices have tumbled by over 50% in the last two to three quarters due to the aggressive stance by manufacturers.

According to the LED Industry Demand and Supply Data Base report by LEDinside, LED packaging revenue in 2018 reached US\$ 18.4 billion, a mere growth of 3.1% over 2017.

The revenue rankings for the top ten LED packaging manufacturers did not change by much from 2017. Nichia, Osram and Lumileds continued to be the top three, while China's MLS retained its top five position along with Seoul Semiconductors. Samsung, Cree, Taiwan's Everlight and Lite-On and NationStar have remained within the top ten. In 2018, only Seoul Semiconductor had an increase in revenue among its peers in the top ten while all the other manufacturers had flat or declining revenues for the same period.

Besides the China-US trade dispute affecting market demand for end products, one of the main reasons for the falling prices was due to the overall oversupply in the industry, which

brought down manufacturers' revenues even further.

In order to promote infrastructure and create jobs, many of China's cities are providing subsidies to attract investments from LED packaging manufacturers which has led to creation of several new LED package manufacturing facilities in the inland provinces of China. This has resulted in a huge expansion in production capacity. Many LED packaging suppliers are making large reductions in prices due to this expansion and even fighting aggressively for orders from first-tier manufacturers in order to consume idle capacity. This has led to explosive revenue growth for many second-tier LED manufacturers, but revenue stagnation for major first-tier manufacturers.

It was not all gloomy for the LED manufacturing market in 2018 as some LED manufacturers did perform reasonably well. One such example is Seoul Semiconductor, whose backlights and automotive lightings made their way into the supply chains of big clients, and whose revenue continued to grow. Lite-On, on the other hand, performed well in infrared LEDs and automotive lighting segments.

Faced with the sluggish demand, LED packaging companies continue to explore niche markets, with horticultural lighting, human centric lighting and connected lighting being the focus.

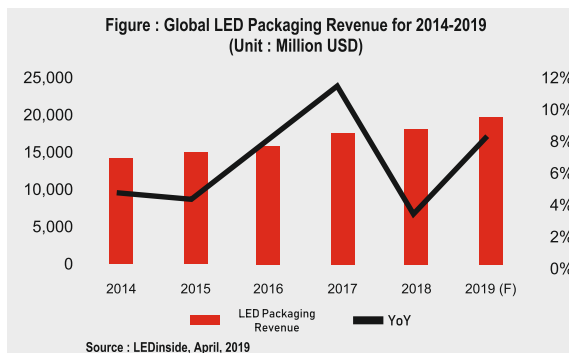
Looking forward, demand is expected to recover as the US-China trade dispute calms down in 2019 and when customer confidence returns, we may see a demand for replenished inventories. LEDinside is anticipating the overall LED packaging revenue to hit US\$19.9 billion, an 8.2% growth YoY over 2018.

Compiled by ILLUMINATION EDITORIAL BOARD based on article published in LEDinside

Table : Global Revenue Ranking for LED Packaging Manufacturers, 2018

Ranking	(For 2018)
1	Nichia
2	Osram Opto Semiconductors
3	Lumileds
4	Seoul Semiconductors
5	MLS
6	Samsung
7	Everlight
8	CREE
9	NationStar
10	Lite-On

Source : LEDinside, April, 2019



# PILOT PROGRAM FOR SAFE DISPOSAL OF CFL BULBS AND TUBES

A status update on ELCOMA's pilot program for safe disposal of Compact Fluorescent Lamps (CFLs) and Tubes

The CPCB Guidelines and the MOEF E-Waste Rules suggest that the Residents Welfare Associations and garbage collection agencies can be the best source for collection of fused, unused or non-operational CFLs and FTLs. Keeping this in mind, the manufacturers of CFLs and FTLs jointly decided to undertake a Pilot Project for collection and disposal of CFLs and FTLs through welfare association with the help of Electric Lamp and Components Manufacturers' Association of India (ELCOMA).

ELCOMA teams visited and signed up over 100 Resident Welfare Associations (RWAs) in Delhi/NCR where bags for safe collection of fused/used CFLs and FTLs were installed. ELCOMA also created awareness among the residents of the colony as well as the garbage collectors in that location regarding the safe collection, storage and disposal of CFLs and FTLs through banners, notices, newspaper inserts, etc.

### Support provided by ELCOMA at RWAs for Safe Disposal of CFLs and FTLs

- Break-safe and spill-proof Bags placed at all RWAs which were supplied by Signify Innovation (formerly known as Philips Lighting India Limited)
- Banners displayed at various points at each RWA
- T-shirts worn by all staff "I Support CFL Safe Disposal Program" provided by Surya Roshni
- Official circular sent to all homes of each RWA
- Newspaper inserts at 2 lakh households
- All used lamps dropped in the boxes were collected and delivered to authorized safe disposal agency

The table provides a summary of the status of the pilot program five months since the start of the same on 1st January 2019. Through the pilot program, ELCOMA made sure that the consumer was not required to visit nearest lighting shop or outlet to deposit used/fused lamps or tubes. The facility for the disposal of these bulbs and tubes was provided to them within their society, a few meters from their own homes. From the initial response to the program it seems obvious that inspite of all efforts made, the collection of used CFL/FTL is not even 1% of the total population of these lamps in the target groups/RWAs.

This case study seems to prove the point that customers are not coming forward to dispose-off the used lamps for safe disposal despite all efforts made to provide them easy access to disposal and creating awareness among residents.

Author: ILLUMINATION EDITORIAL BOARD

Sl. No.	Item	Data
1	No of RWAs (Societies) Covered	116
2	Total No of Apartments	52,768
3	Total Population covered	2,11,072
4	Total No of CFL Points covered	4,22,144
5	Total No of CFL Bulbs Collected and Safely Disposed as on 31.05.2019	128
6	Total No of FTL Tubes Collected and Safely Disposed as on 31.05.2019	312
7	Total No of CFL + FTL Replaced	440
8	Total % of CFL + FTL Sockets Replaced	0.10%



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# IEC-ELCOMA-LVDC CONFERENCE

9th August, 2019

## Shape of Future Products & Grids

Gulmohar Hall, India Habitat Centre, New Delhi

09:00 AM to 04:00 PM

### OVERVIEW

ELCOMA is the Apex body of lighting manufacturers in India. Our members are proactive in manufacturing all products indigenously in India which incorporate the latest technologies and are more energy efficient. To create awareness on new technologies among stakeholders, we organize several events like conferences, exhibitions, etc each year and are now organizing a Conference on Low Voltage DC (LVDC) on 9 August 2019 at the Gulmohar Hall, India Habitat Centre, New Delhi

The International Electrotechnical Commission (IEC) is the world's leading organization that prepares and publishes International Standards for all electrical, electronic and related technologies. Close to 20,000 experts from industry, commerce, government, test and research labs, academia and consumer groups participate in IEC Standardization work.

The IEC is one of three global sister organizations (IEC, ISO, ITU) that develop International Standards for the world. When appropriate, IEC cooperates with ISO (International Organization for Standardization) or ITU (International Telecommunication Union) to ensure that International Standards fit together seamlessly and complement each other. Joint committees ensure that International Standards combine all relevant knowledge of experts working in related areas.

### WHY THIS CONFERENCE?

The government plans to provide power to new and non-electrified areas through renewable sources like solar, wind, etc. This dictates that the power generated will primarily be DC supply. We also know that most of our present consumer products use DC power, even though power is supplied to these products as AC which is then converted to DC using a driver. This adds to the cost of power delivery and causes extra power consumption. This conference will give an opportunity to stakeholders to interact with experts and discuss plans on how to prepare for LVDC, both from power generation and supply perspective as well as its impact on end products.

### WHAT WILL YOU LEARN?

You will learn what is driving the development of LVDC and what it will take to safely and broadly roll-out this technology; the important role LVDC will play in universal energy access and economic development; use-cases from other countries. You will learn to start preparing for manufacturing of future components, end products, after sales service training and the progressive transformation from High Voltage to Low Voltage DC power supply. Those who will miss out will have to depend on learning later from others who have already taken lead in change.

### WHO SHOULD ATTEND?

Stakeholders engaged or interested in electricity access and low voltage direct current (LVDC): Manufacturers of electronic Products. Technical experts, government representatives, funding agencies, investors, insurance companies, power utilities, equipment manufacturers and NGOs.

#### SKILL INDIA PARTNER:



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## WHY SHOULD YOU ATTEND?

LVDC is an important tool to expand real, reliable access to electricity. The future power supply system will possibly change to 50V DC. As a result, new and renewable energy will take front stage and will pave the way for conversion of our country's entire power supply system. Therefore there is an urgent need to prepare for a new product and manufacturing technology to adapt to these changes. For example, street lights for these grids will not require drivers, Domestic Electronic and Lighting products will not require transformers and most importantly, these future products will be very safe and economical to run. This an opportunity for you to provide your inputs and understand more about the technology and what it means for your local needs and requirements; hear about economic opportunities linked to LVDC; contribute to the development of key performance and risk assessment indicators that will allow regulators and systems administrators to benchmark LVDC solutions from different vendors and fund and insure LVDC infrastructure.

## WHO WILL BE THERE

 <p><b>Mr. Cristiano Masini</b> Manager Wiring Devices and Cable Management Standardization Coordination, Bticino, Italy</p> <p><b>Presentation title: "Impact of LVDC on buildings and emerging opportunities"</b></p>	 <p><b>Dr. R. Ramarathnam</b> Executive Chairman, Basil Energetics Private Ltd., Chennai. Chairman, Westcott Electricals (P) Ltd., Chennai</p> <p><b>Presentation title: "Rooftop Solar System with Smart Nano/Micro Grid &amp; DC Appliances"</b></p>	 <p><b>Mr. Harry Stokman</b> Chairman Member, IEC Systems Committee - LVDC Chair of WG2, SyC LVDC Netherlands</p>
 <p><b>Mr. Vimal Mahendru</b> President, Legrand – India Chair, IEC Systems Committee - LVDC Member, Standardization Management Board, IEC</p>	 <p><b>Mr. Narendra Kumar Mohapatra</b> Chief Executive Officer Electronics Sector Skills Council of India (ESSCI)</p>	 <p><b>Mr. Rajeev Sharma</b> Head, Electrotechnical Department, Bureau of Indian Standards</p>
 <p><b>Prof. Ashok Jhunjhunwala</b> did his B.Tech degree from IIT Kanpur and MS and PhD from University of Maine, USA and was a faculty at Washington State University, USA for a year and half before joining as a faculty at IIT Madras in 1981.</p>	 <p><b>Mr. Vinod Behari</b> Chief Executive Officer Power Sector Skill Council</p>	 <p><b>Mr. Saurabh Kumar</b> Managing Director Energy Efficiency Services Limited</p>
 <p><b>Mr. Abhay Bakre</b> Director General Bureau of Energy Efficiency</p>	 <p><b>Mr. Ajay Mathur</b> Director General The Energy &amp; Resources Institute (TERI)</p>	 <p><b>Ms. Surina Rajan</b> Director General Bureau of Indian Standards</p>

## CONFERENCE AGENDA

**REGISTRATION 09:00 AM to 9:30 AM**

<b>Inaugural Session</b>	<b>09:30 - 10:30</b>	<p>Welcome and Introduction – Mr. Shyam Sujana, Secretary General, ELCOMA</p> <p>Introduction to LVDC – Mr. Vimal Mahendru, Chair, IEC Special Committee</p> <p>Initiatives to promote off-grid power – Mr. Saurabh Kumar, Managing Director, EESL</p> <p>Energy for millions – Dr. Ajay Mathur, DG, TERI</p> <p>Address – Mr. Ajay Bhakre, DG, BEE</p> <p>Address – Ms. Surina Rajan, DG, BIS</p> <p>Solar DC for Homes – Mr. Ashok Jhunjhunwala, IIT, Madras</p> <p>Transforming the rural scenario with LVDC – Mr. Raju Bista(MP, Lok Sabha), President, ELCOMA</p> <p>Key Note address – Mr. Ajay Prakash Sawhney, Secretary, Meity</p> <p>Vote of Thanks – Mr. Sunil Sikka, Advisor, ELCOMA</p>
<b>Session-I</b>	<b>10:30 - 11:45</b>	<ol style="list-style-type: none"> <li>1. Impact of LVDC on buildings and emerging opportunities – Mr. Cristiano Masini, Members of the IEC Systems Committee LVDC, Secretary of IEC Tc23</li> <li>2. Rooftop Solar System with Smart Nano/Micro Grid &amp; DC Appliances – Dr. R. Ramarathnam, Chairman, Basil Energetic Private Limited</li> <li>3. Solar – DC for decentralised home deployment – Dr. Ashok Jhunjhunwala, IIT Madras</li> </ol>
<b>Session-II</b>	<b>12:30 - 13:15</b>	<ol style="list-style-type: none"> <li>4. LVDC in mature grids – Mr. Harry Stokman, Chairman, DC Expert &amp; Member of the IEC Systems Committee LVDC</li> <li>5. Spotlight – Bajaj Electricals</li> <li>6. Presentation – Mr. Harry Stokman, Chairman DC Expert &amp; Member of the IEC System Committee LVDC</li> <li>7. Presentation – Mr. Vimal Mahendru, Chair Systems Committee LVDC</li> <li>8. Surya Roshni – Sponsor spotlight</li> </ol>
<b>Session-III</b>	<b>14:15 - 16:00</b>	<ol style="list-style-type: none"> <li>9. Electricity Access in LVDC – Mr. Rajeev Sharma, Head ETD, BIS</li> <li>10. Spotlight – Jaquar Lighting</li> <li>11. Skill Training program for LVDC Grid system – Mr. Vinod Behari, PSSC-India</li> <li>12. Sponsor spotlight – Havells India</li> <li>13. Skill program for DC based product and components – Mr. N K Mohapatra, ESSCI</li> <li>14. Solar Street Light Program – EESL</li> </ol>

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# CHHATTISGARH INDUSTRIAL POLICY

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## CHHATTISGARH INDUSTRIAL POLICY OBJECTIVES

1. To promote the manufacturing sector on a priority basis and design a program called "Make in Chhattisgarh" along the lines of "Make in India".
2. To bring Chhattisgarh state at par with developed industrial states of the country by 2024 by reaping the benefits of the enabling environment created for inclusive rapid industrialization in the State.
3. In addition to the established sectors, facilitate industrial development in sectors which are relatively new to the State and are not yet established.
4. To create a conducive environment for promotion of exports and attract foreign investments by encouraging establishment of Special Economic Zones and other enabling infrastructure in the State.
5. To increase the per capita income and gross domestic product of the State by making the process of capital investment in the state easier and competitive and providing comparatively better financial incentives.
6. To ensure balanced industrial development by providing relatively higher economic incentives for industrial development to the industrially backward blocks of the State.
7. To establish Industries in sectors which are environment friendly and which rely on skilled manpower such as Information Technology, Bio-Technology, Agriculture, Food Processing, Automobile, Pharmaceutical, Electrical & Electronics, New and Renewable Energy Equipment Manufacturing and Core sector based down-stream industries on a priority basis

The state of Chhattisgarh has immense possibilities for industrial development due to large amount of mineral resources; 44% forest area, peaceful labour environment and availability of good infrastructure.

It is well connected through road, rail and air links to all major metro cities of the country and the State Capital "Naya Raipur" is being developed as the first greenfield "Smart City" in the country with planned underground network of power supply and communication facilities. Chhattisgarh is self-sufficient in power supply and has virtually "zero power cuts". The electricity rates in Chhattisgarh are lower as compared to the other developed states in the country and due to uninterrupted quality power supply and abundance of mineral resources, the price of cement, steel and aluminum is comparatively lower.

The state is aggressively adopting 'Ease of Doing Business' practices towards facilitating transparent and public oriented administration. Online platforms are being promoted for issuing all types of sanctions, approvals etc, time frames for specific procedures have been fixed and provisions of 'Deemed Approval and Self verifications' have also been introduced. Due to its geographical location, abundant natural resources, availability of land at competitive prices, availability of skilled labour, quality uninterrupted power supply and other factors, the State of Chhattisgarh has been able to attract sizeable investment in the industrial sector.

The rate of industrial growth in the state has been 6.07% due to the successful implementation of the third Industrial Policy 2009-14. Chhattisgarh achieved significant increase in exports from INR 1,675 crores in 2009-10 to INR 7,701 crores in 2013-14.

Out of a total planned power generation projects of 60,000 MW by the Energy

Department, the establishment of power plants with a capacity of approximately 20,000 MW is under various stages of implementation which has also brought in capital investment of INR 1,20,000 crores.

The state is establishing three railway corridors (East corridor, North corridor and East-West corridor) with a cumulative length of over 300km and the main trunk pipe line of Government of India's proposed Gas Pipeline from Surat in Gujarat to Paradip in Odisha will cross through four districts of the State. On completion, these projects will have a revolutionary impact on industrial development in the concerned districts and the adjoining areas of the State.

## INCENTIVES FOR INDUSTRIAL INVESTORS

Entrepreneurs under the general category will receive interest subsidy, fixed capital investment subsidy, electricity duty exemption, stamp duty exemption, exemption / concession in land premium on allotment of land in industrial areas, project report subsidy, land-diversion fee exemption, Reasonable service charges for land allocation, quality certification subsidy, technical patent subsidy, technology purchase subsidy, margin money subsidy, entry tax exemption and disabled employment subsidy.

In order to promote establishment of private industrial areas in minimum 25 acres of land, subsidy of 30% of the infrastructure cost (except land) with a ceiling of INR 5 crores and exemption from stamp duty, registration fee of land and land diversion fee will be given. The industries being established in these industrial areas will also be given industrial investment promotion benefits.

Author: ILLUMINATION EDITORIAL BOARD



# SOLARISING INDIA'S FUTURE

Continuing the momentum in clean energy capacity addition, EESL is implementing two MNRE Initiatives - Solar Study Lamps Scheme and Atal Jyoti Yojna (AJAY)



underserved regions across five states - Assam, Bihar, Jharkhand, Uttar Pradesh and Odisha, but also bring a positive change in the communities.

## LIGHTING UP LIVES WITH SOLAR STUDY LAMPS

Initiated in 2016, the 70 lakh Solar Study Lamps Scheme is an intervention for affordable and environmentally-sustainable illumination in areas where household electricity connection is less than 50 percent. EESL and IIT Bombay are implementing this project to distribute the solar lamps at subsidized rates, among students in rural areas. This is being done in association with the State Rural Livelihood Missions

(SRLMs).

Even though electricity supply is available in those areas, it is a challenge to supply continuous and reliable power supply throughout the day. Erratic electricity supply hinders the ability of school children to pursue their studies in the evening hours. Now, with access to economic and environmentally sustainable solar study lamps, they are no longer dependent on kerosene lamps, nor do they need to end their studies at sundown.

70 lakh students from 223 blocks spread across 57 districts are being covered under this scheme. As of now, more than 46 lakh lamps have been distributed to school students in the five states. These lamps provide 150 Lux light intensity for studying, the recommended level of light for casual reading. Additionally, the scheme also builds awareness of, and confidence in, solar technology, by providing rural communities with first-hand experience of solar products,

India has been actively shaping global efforts to combat climate change. Led by a 100GW target of solar energy, the government's aggressive 175GW by 2022 renewables push is setting new benchmarks in energy sustainability.

As per a recent report by Bloomberg New Energy Finance, renewable energy is anticipated to reach 49 percent of installed capacity in India by 2040 as batteries and new sources of flexibility bolster the reach of renewables. The report further claims that India's emissions are expected to be significantly lower in 2040 as the country embraces solar power and invests in PV construction.

Continuing the momentum in clean energy capacity addition, Energy Efficiency Services Limited (EESL) is implementing two Ministry of New and Renewable Energy (MNRE) initiatives, namely the 70 lakh Solar Study Lamps Scheme and Atal Jyoti Yojana (AJAY). These projects will not only illuminate the

*“...with access to economic and environmentally sustainable solar study lamps, children are no longer dependent on kerosene lamps, nor do they need to end their studies at sundown.”*

*70 lakh students from 223 blocks spread across 57 districts are being covered under this scheme”*

Venkatesh Dwivedi  
Director (Projects)  
Energy Efficiency Services Limited (EESL)



*“IIT Bombay provided a 16-day training to these women from a self-help group under the State Rural Livelihood Missions (SRLMs). Through the assembly and distribution of these lamps, the women are earning around Rs. 4000-6000 per month”*

Venkatesh Dwivedi  
Director (Projects)  
Energy Efficiency Services Limited (EESL)

thereby encouraging them to use various solar products to fulfil their needs.

#### **SOLAR LAMPS AS SOCIO-ECONOMIC ENABLERS**

Apart from benefiting schools and students in rural communities, the scheme has also employed 6151 people, including 5933 women. As many as 10 women work at each of the 190 Assembly and Distribution Centres (ADCs) across the country, assembling a total of 30000 solar study lamps every day.

EESL procures different lamp components, including Printed Circuit Boards (PCBs), plastic body frames, 1W LED and solar panels in bulk and sends them to Assembly & Distribution Centres, where the lamps are assembled, tested and distributed by local women. IIT Bombay provided a 16-day training to these women from a self-help group under the State Rural Livelihood Missions (SRLMs). The women were trained on assembly, distribution, management, repair and maintenance, enterprise and soft

skills. Through the assembly and distribution of these lamps, the women are earning around Rs. 4000-6000 per month. They earn Rs. 12 per lamp and they assemble around 40-50 solar lamps in a day. This financial empowerment has fostered a sense of confidence in them, as they can contribute to their household income while also developing their skills.

This is 'localisation of solar energy': solar study lamps are assembled, distributed, repaired and maintained by rural people, thus expanding the potential for livelihood generation at the local level. Moreover, localisation gives an impetus to the rural economy through skill-generation and capacity-building.

Each lamp is covered by a five-year warranty and costs INR 100 each to the students. Remaining cost of the lamp is paid by MNRE as subsidy. In the three sequential tenders completed for the program, the cost of the lamp has reduced by 12.5 percent. This



reduction, due to EESL's model of large-scale demand aggregation and procurement has not only enhanced adoption of the lamps, but also resulted in employment generation due to indigenous manufacturing. In case of failure, the lamp can be replaced/repared at a Repair & Maintenance (R&M) centre. As per an internal assessment by IIT-B, the number of defective pieces currently stands at less than 1 percent.

#### **BRINGING SOLAR LED STREETLIGHTS TO REMOTE VILLAGES**

To improve the quality of life of all sections of the population through improved, efficient and clean lighting, MNRE launched the Atal Jyoti Yojana (AJAY) to illuminate dark regions across five states with high-mast solar LED street lights. This is a sub-scheme under Off-Grid and Decentralised Solar Application Scheme of the Ministry. These lights are being installed on major roads, markets, public places at intersections in remote areas and villages that lack adequate street lights, thereby contributing to the safety of residents in these states. EESL is implementing the program in rural, semi-urban, and urban areas that face less than 50 percent grid connectivity

by installing 3 lakh high-mast solar LED street lights. As of now, over 1.34 lakh solar LED street lights have been installed and work has started to install the remaining 1.5 lakh plus solar street lights.

With the successful ongoing implementation of the first phase, the Ministry has received approval to launch phase II of this scheme. Under phase II, over 3 lakh solar LED street lights will be installed in Uttar Pradesh, Bihar, Jharkhand, Odisha, Assam, Jammu and Kashmir, Himachal Pradesh, Uttarakhand, North Eastern states including Sikkim, Andaman & Nicobar, Lakshadweep, and parliamentary constituencies covering 48 aspirational districts.

These schemes have demonstrated the huge potential India has in implementing solar technology interventions because people, especially children and women, have understood the benefits of solar technology and are keen to explore more. There is a need to explore more innovative technologies and business models so that more and more people can access such benefits.

*“As of now, over 1.34 lakh solar LED street lights have been installed and work has started to install the remaining 1.5 lakh plus solar street lights”*

Venkatesh Dwivedi  
Director (Projects)  
Energy Efficiency Services Limited (EESL)

**Author: VENKATESH DWIVEDI**  
Director (Projects), EESL

Views expressed in this article are those of the contributors and do not necessarily reflect those of the editors or publishers.



## SWITCH KARO, SAVE KARO

PEOPLE HAVE LED  
THE WAY TO A  
BRIGHTER &  
SMARTER INDIA!



AVAILABLE  
ONLY FOR  
**INR 70**



FREE  
REPLACEMENT  
FOR **3 YRS**



SAVES  
**80%**  
ENERGY



AVAILABLE  
ONLY FOR  
**INR 220**



FREE  
REPLACEMENT  
FOR **3 YRS**



SAVES  
**50%**  
ENERGY



5 - STAR RATED  
FANS ONLY FOR  
**INR 1110**



TECHNICAL  
WARRANTY  
OF **2.5 YRS**



SAVES  
**33%**  
ENERGY

\*Inclusive all taxes

UJALA appliances are available at all DISCOM offices/ billing counters/post offices/CSC counters and selected petrol pumps in your city. Please contact helpline number: **1800 180 3580** or mail us on [helpline@eesl.co.in](mailto:helpline@eesl.co.in)

For more information on the UJALA scheme, visit [www.ujala.gov.in](http://www.ujala.gov.in)

# PRODUCT QUALITY AND DESTRUCTIVE TESTING

An overview of tests used to determine product reliability



**P**roduct testing is not only important in order to meet the regulatory requirements like product certifications but also to ensure that the product conforms to the specifications defined in standards or as declared/claimed by the manufacturer/brand. Conformance of the product to the specifications ensures that the product is of the right quality when delivered to the customer. When we talk about product quality the mostly used definitions and interpretation of it are : conformance to specifications, fitness for use, delivering the promised performance to the customer at a given price, etc. But quality by definition is a parameter which is measured at least on two points on a timeline

1) Zero-hour quality – which the customer

checks at the point of purchase of the product or at the time of installation and a few days thereafter.

2) Quality over period of time – this is actually known as product reliability

To check conformance of the product to both zero hour quality and reliability, two types of testing is done on the product.

- Destructive tests are tests carried on products for detecting flaws in the product but in the process impairs the product and prevents its use for further testing or normal use.
- Non-destructive tests are tests carried on products for detecting flaws in materials without impairing their usefulness in future.

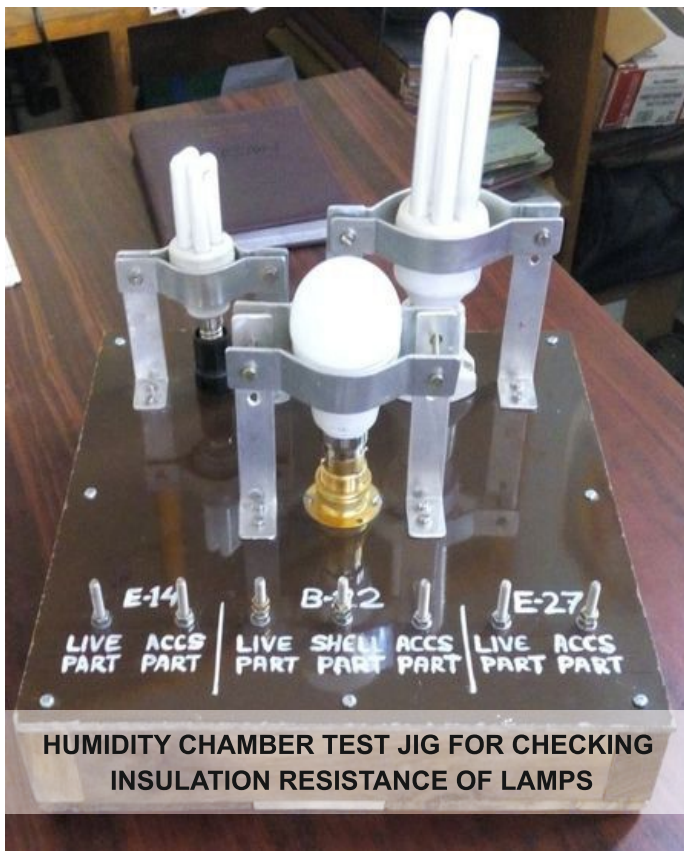
Destructive tests indicate how and when the objects are in danger of breaking down or failing. Destructive testing includes methods where material is broken down to evaluate the mechanical properties, such as strength,

toughness and hardness.

For example, in the mechanical strength test for LED bulb, the torsion resistance of unused lamps is tested by applying torque on the lamp cap. The bulb cap should meet the minimum specified value and should not break or become loose. The specification as prescribed in the Indian Standard is 3 Nm. If the manufacturer wishes to know the torque level at which the cap gives way and becomes loose or detached from the bulb (a phenomenon or defect termed as loose cap) then the torque level is gradually increased during testing till the defect is visible. This then becomes the specification and can be higher than 3 Nm as specified in the standard. In either case, this sample exposed to torsion testing cannot be used for further tests.

In other words, Destructive testing is a testing technique in which the product is made to fail in an uncontrolled manner to test the robustness of the product and also to find the point of failure. Destructive testing is performed under the most severe operating conditions and it is continued until the





HUMIDITY CHAMBER TEST JIG FOR CHECKING INSULATION RESISTANCE OF LAMPS



EQUIPMENT FOR TORSION RESISTANCE TEST ON LAMPS

application/product breaks.

Destructive testing is most suitable, and economic, for products which are mass-produced, as the cost of destroying a small number of sample specimens is negligible. It is usually not economical to do destructive testing where only one or very few items are to be produced.

In other words, destructive tests are those tests which are carried out to achieve the failure of the specimen to verify properties of a material and help to reduce failures, accidents and additional design costs.

**Author: AMAL SENGUPTA**

General Manager,

Signify Innovations India Limited

(formerly known as Phillips Lighting India Limited)

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#### COMMONLY USED DESTRUCTIVE TESTS FOR LIGHTING PRODUCTS

- **Insulation Resistance after humidity test** : the insulation resistance between live parts of the cap and accessible parts of the lamp are measured. This should be at least 4 MΩ, after the lamp is subjected to humidity conditions as defined in the method of testing in the standard
- **Electric Strength after humidity test** : This test follows the insulation resistance test where the same parts are exposed to voltage levels as per prescribed values and there should not be any breakdown or flash over.
- **Torsion Resistance of unused lamps** : The lamp cap should withstand torque level of 3 Nm
- **Cap temperature rise** : The surface temperature rise (above ambient temperature) of a lamp holder fitted to the lamp should not be higher than that of the lamp type which is being replaced.
- **Resistance to Heat** : This test is used to ensure that the lamp is sufficiently resistant to heat and shall protect the insulating parts which provide protection against electric shock.
- **Resistance to Flame and ignition** : in this test, when the lamp sample is subjected to glow wire tip of 650°C for 30 seconds, any flame or glowing of the sample should extinguish within 30 seconds after the glow wire is withdrawn and any flaming dropping on a tissue paper placed 200 mm below should not ignite the tissue paper
- **Fault Conditions** : This is a test in multiple configurations where the lamp when exposed to extreme electrical conditions like over voltage / short circuit, etc. will fail safe and the lamps will not impair safety.

# CUSTOMIZABLE CRYSTAL DREAMS





Contemporary homes are the new trends of the season and decorating them with the right home accessories is the key to transforming a good home into a great home. There are few bigger statements of luxury in an indoor space than a sparkling chandelier.

Jaquar Lighting's decorative lights offer an extensive range of 'complete lighting solutions' that suit the aesthetics and decor of every commercial and residential space. Their LED decorative lights come with an artistic touch that is designed to brighten / enhance indoor spaces at home or office.

Designer Chandeliers offered by Jaquar Lighting are the perfect accessories that can add a traditional yet contemporary look to homes. Made with lead-free Spectra and Strass Crystals from Swarovski, the brass in the frame of the chandeliers comes with a seven year warranty on the plating – which ranges from 24K Gold and Rose Gold to Chrome, Antique Brass and Copper. Jaquar

ensures that special care is taken in fabricating and plating of these chandeliers which are manufactured in-house at Jaquar Lighting's state-of-the-art manufacturing facility. Jaquar is the only Indian brand to have its own production facility for crystal chandeliers.

These crystal chandeliers are available in classic and contemporary styles, reflecting traditional grace or modern elegance and are available in 3-head to 24-head designs, with suspended or ceiling-mounted options.

Apart from the extensive off-the-shelf catalogue choices, Jaquar Lighting also offers a unique customisation option in Crystal chandeliers - you can redesign, mix and match, and even ask to increase or reduce the crystals used in the chandeliers you select.

Jaquar Lighting's chandeliers have found place in some prominent hotel chains in India like JW Marriott, Royal Orchid, Hyatt and Mayfair Hotels, as well as some leading offices like Hewlett Packard (HP), Tanishq etc.

**Author: JAQUAR LIGHTING**

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Jaquar Lighting, a part of the Jaquar Group, offers a complete range of LED solutions for an array of needs and requirements - from indoor living to outdoor landscaping and decorative pieces.

Jaquar Lighting's portfolio consists of lighting solutions for residential, commercial and outdoor applications for varied budgets without compromising on quality and reliability - whether it is LED Bulbs, Tubelights, Chandeliers, Landscape Lighting or Track Lights.

Jaquar Lighting provides its customers with some of the most advanced, high performance lighting systems and adds an aesthetic appeal that completely transform their homes. Jaquar Lighting also offers services like lighting planning and has pan-India onsite assistance support for customers.

# SOLAR DC POWER AND MICROGRIDS

## ENSURING QUALITY POWER IN RURAL INDIA

A look at how Solar DC MicroGrids are powering India's Rural Electrification Program



means of electrification. Electrification to them meant a system capable of supporting a minimum of several lights, a fan, a cell phone charger and a TV point. A conventional rooftop solar system with AC output inherently had too many losses and was expensive. Furthermore, these systems had the limitation that they would not be able to connect to the power grid, if and when the grid reached the village.

As a result of these, a solar DC system has evolved in India, which has become the basis of electrification in these remote villages.

These solar DC systems are now being deployed in desert and mountainous terrain to provide electric power to remote villages and are redefining the next frontier of such home systems. These "Village-level MicroGrids" appear to have some answers to the problems of existing grid-connected systems as well as the limitations of off-grid systems.

The Indian Institute of Technology, Madras (IIT Madras), had taken up the development of a 48V Solar DC system catering to not only off-grid homes but also to the ones with grid connection. Because power outages (power cuts) are still common, varying from 30 min per day to 14 hours per day in many rural areas, many homes use battery-backed systems called inverters. IIT Madras developed a solar system called inverterless-500, with output power supplied in DC form rather than converting it to AC form. The system interfaces directly with a solar panel varying in size between 125 and 500 Watt peak. The grid input (when the grid is available) is also up to 500W, converted to 48V DC and combined with solar output. The combined output can charge a battery and provide a 48V DC distribution line within homes. When solar energy or the grid cannot supply the power output required, the battery

The village-electrification program has been the focus of the Indian government for many years. Till a decade ago, there was an acute shortage of power in India. The power demand exceeded supply by several folds as a result of which there was a very weak push to extend the power grid to villages. Recently the energy costs for solar and wind power have attained parity with grid power, enabling the addition of significant capacities for renewable power in India.

Simultaneously, the power grid has been strengthened and India attained a single national grid on 31 December 2013, which meant that power generated in surplus areas could be transported to deficit regions.

However, due to various reasons, the power grid is not able to reach a significant number of villages, especially those in far-flung areas, deserts, mountains and difficult terrains. A rooftop solar system to provide electricity to these off-grid homes was envisioned as a viable solution for rural electrification.

### Evolution of Solar DC System

Early efforts to put a solar light in each home were not acceptable to many villagers as



*"IIT Madras developed a solar system called inverterless-500, with output power supplied in DC form rather than converting it to AC form"*

output pitches in. The system is designed to minimize conversion losses. When solar energy directly powers the load, losses are approximately 3%, whereas losses rise to 10% when solar power is first stored in the battery and supplied to the load. The grid-to-load losses are limited to 6% and through the battery it goes up to 15% when lithium-ion battery storage is used. The net result is that a 125W solar panel can power a small home including multiple lights, a fan, a TV and a cell phone charger when used with a battery of 1.25 kWh.

### Transporting the Solar Systems

Nowadays solar systems have become relatively inexpensive, each costing approximately Rs. 30,000 and include solar panels, the inverterless-500, a battery, fans, lights and a cell phone charger. The size and weight of this system is also very small. They can be carried over difficult terrain and have been used to provide power in homes in remote areas in several states including Assam, Manipur, Jammu and Kashmir, Rajasthan and Madhya Pradesh.

Despite all this, the transportation and deployment of these solar DC systems was a challenge. The state of Rajasthan had desert areas with scattered homes. Tractors and camels are used to transport these solar DC systems where normal vehicles cannot tread.

Assam, with its villages scattered across the length and breadth of the state, has either extreme hilly terrain or slushy river banks in the regions bordering the mighty Brahmaputra. Most roads are mud with no tarring so most of the material is moved in small trucks and tractors are used where the incline is very steep. The last lap almost always involves head loading/hand carrying of material and can sometimes take up to four days.

Despite all the difficulties involved in taking the material to the villages, there is a great joy when a home is electrified and fans and cell phone chargers are enabled. Beneficiaries are identified, and their eligibility for electricity

connections along with applicant photographs and identity proof are registered on the spot. The great reward is changing the lives of the people by providing them with electricity.

### DC Powered Equipments

Making the equipment DC powered is an important step, as most appliances inherently need only DC power to operate. To make these solar DC systems more efficient, it is even more relevant to design highly energy efficient appliances and fixtures. When grid connectivity is not available these devices have to be operated on stored solar power, which is limited and expensive.

An induction motor-based ceiling fan usually consumes 72W of AC power at full speed. The power consumption of these fans can be reduced to merely 30W at full speed, when a 48V DC powered brushless DC motor (BLDC) based fan is used. Similarly, a DC-powered DC motor-based refrigerator is being developed, so that the average power consumed will be reduced substantially. An Indian company has developed a DC-powered BLDC air cooler, which consumes only 60W at peak speed, as opposed to 125W for an equivalent AC air cooler. A switched-reluctance motor-based 48V DC food mixer/grinder consumes a peak power of only 150W when compared to 350W for an equivalent AC powered mixer. Another very important product being developed for this segment of users is a 48V DC powered energy efficient DC induction stove that can do most of the cooking at 500W peak power.

### MicroGrids that are Powering Rural India

There are two types of practically deployable MicroGrids that are being installed in India.

The first one is where solar DC systems in individual homes are connected to each other on a 380V DC MicroGrid. The 380V DC connection is bidirectional. The solar DC system at the homes can take in energy from or give out energy to the MicroGrid, thus sharing energy between homes. If a home uses an appliance on some days for a longer time, it can draw power from other homes in

the grid that have excess stored power. The control for such a system is decentralized. Based on the state of the battery, the home is placed in a surplus mode, when power can be drawn from it, or in a deficit mode, when it can draw power from the MicroGrid. The state surplus or deficit can be changed by the local controller any time. The controller can also limit the maximum current that a home can draw or deliver dynamically. When a home in the deficit state attempts to draw power from the MicroGrid, all homes in the surplus state will contribute. If none of the homes are in the surplus state, the home will not be able to draw power.

The second type of MicroGrid does much more than sharing. Although it connects the solar DC systems of each home to a 380V DC MicroGrid that enables power sharing between homes, this MicroGrid has power generation sources and storage and the centralized power generation sources could be wind and/or solar. The centralized storage can be large and store excess energy from a home or from centralized sources. It is also possible to connect the power grid to this 380V DC MicroGrid when available.

It is envisaged that the solar DC system in each home as well as the centralized power generation and power storage will have communication capability (GPRS for example). Through this, each source, storage and consumption point will share the data with a centralized power management system (pMs). The pMs can decide on the extent of power to be stored at any time at each home and centralized storage as well as which node will transmit and which will receive the power, while sharing power. If there is an overall shortage of power, the pMs can inform the individual node to restrict usage.

These robust solutions are expected to provide power to rural India. These MicroGrids are being installed in Jharkhand and the Andaman Islands now and will help pave the way for future power solutions for rural India.

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IIT Madras

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# 50% OF LEDs SOLD UNSAFE : STUDY

Times of India (Delhi) Article on 28 Jun 2019 highlights Nielsen Report covering 8 cities

About half of all LED bulb and downlighter brands currently sold in the market, including the metros, are unsafe and manufactured illegally, a study conducted by market research firm Nielsen across 400 retail outlets spanning eight cities has found.

The study said these bulbs and downlighters flouted consumer safety standards prescribed by the Bureau of Indian Standards and the Ministry of Electronics and Information Technology (MeitY). The government also lost tax revenue because these were manufactured illegally.

energy efficient products and harm the image of the LED industry," Raju Bista, president of ELCOMA (Electric Lamp and Component Manufacturers Association), said. Such high percentage of illegally manufactured bulbs and downlighters, which make up 72% of the market, also means a substantial loss to the exchequer. ELCOMA reckons the Indian LED market size to be worth Rs 11,400 crore.

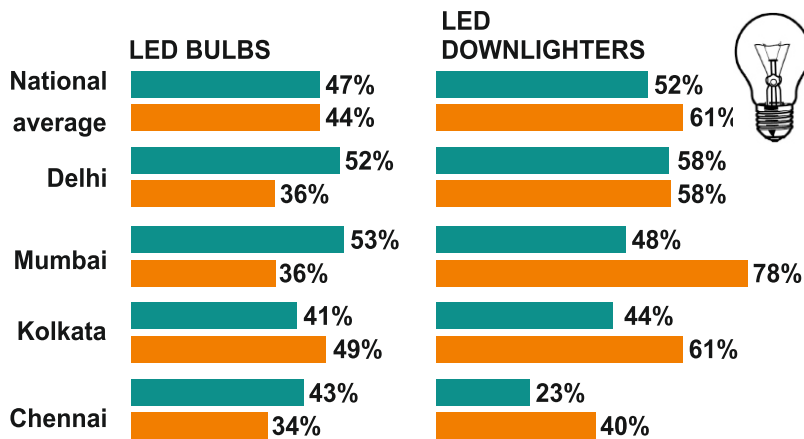
"The LED industry has grown significantly over the past 5-6 years and this has led to the entry of several products that are non-compliant to BIS safety standards. The government must ensure better compliance to safety standards," Sumit Padmakar Joshi, ELCOMA vice president, said. The Nielsen study was conducted across New Delhi, Mumbai, Kolkata, Chennai, Durgapur, Bareilly, Ahmedabad and Hyderabad. The study found 52% of LED bulb and 58% of downlighter brands surveyed in Delhi did not conform to standards and did not have the BIS quality mark.

In the LED bulb category, Hyderabad had the highest non-compliance levels in BIS mark at 57% and Ahmedabad at 60% had the highest non-compliance levels in legal metrology. In the LED downlighter category, Bareilly had the highest non-compliance in BIS mark at 78% and Mumbai topped the charts in non-compliance in legal metrology at 78%.

Ultimately, it harms government initiatives such as 'Make in India' aimed at promoting investment and domestic manufacturing.

## SAFETY HAZARD

% of Non-compliant brands ■ BIS Mark ■ Legal Metrology



The study found 47% of LED bulb brands and 52% of LED downlighter brands did not meet the prescribed safety standards. Market sources told TOI they were manufactured at ramshackle facilities with cheap imported kits, mostly from China.

These bulbs and downlighters were also less energy efficient, defeating the purpose of adopting LED lamps. "This will negatively impact the government's focus on promoting

*"This will negatively impact the government's focus on promoting energy efficient products and harm the image of the LED industry,"*

Raju Bista,  
President of ELCOMA  
(Electric Lamp and Component Manufacturers Association)

ARTICLE PUBLISHED IN TIMES OF INDIA DELHI

On 28 Jun 2019

Sanjay.Dutta@timesgroup.com

# GUANGZHOU INTERNATIONAL LIGHTING EXHIBITION

A Picture postcard from Guangzhou Light Fair

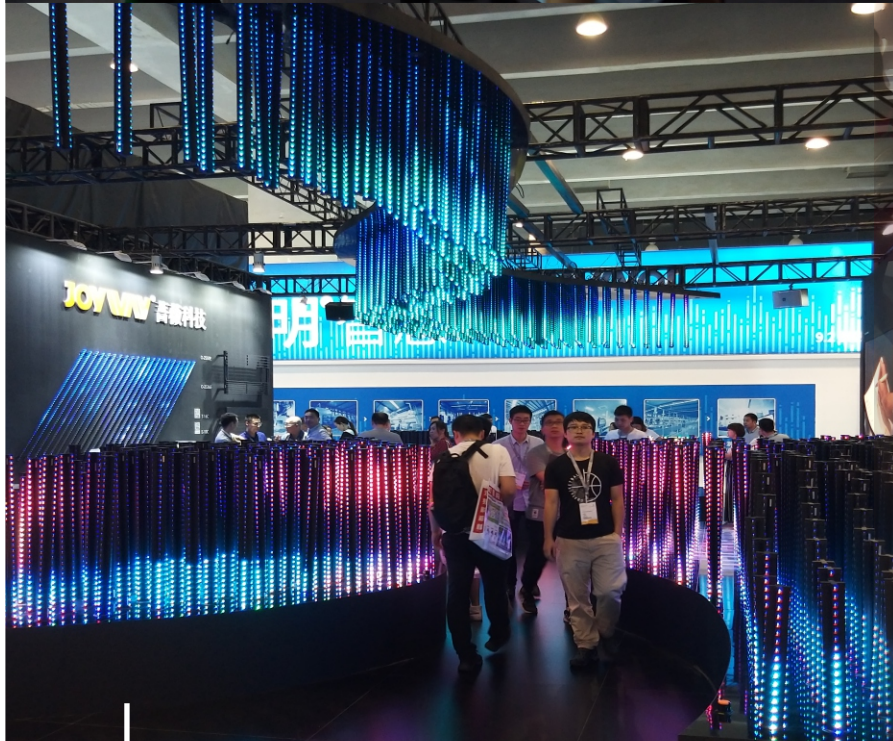
The world's biggest lighting exhibition, the Guangzhou Lighting Fair also known as Canton Lighting Fair, is the most highly regarded platform for the LED and lighting industry, both by the number of exhibitors and by the product scope expanded to serve this ever-evolving industry.

The Guangzhou International Lighting Exhibition is Asia's most influential and comprehensive lighting and LED event and an industry platform for cultivating new business opportunities from both within and outside the traditional industry realms. Every year, Guangzhou International Lighting Exhibition sets the stage for discovering new industry breakthroughs.

The theme of Guangzhou International Lighting Exhibition (GILE) 2019 was – THINK LIGHT: Envisage The Next Move. This theme emphasised the up coming disruptive technologies and the importance of embracing change in the lighting industry, whether that be in the shape of smart and connected lighting, LED miniaturisation or even human-centric lighting.

The exposition aimed to encourage the lighting community to see the changes as a means of progression and innovation. The lighting supply chain is also undergoing change with the growth of smart lighting and lot applications as software developers, electronic engineers and lighting manufacturers begin to collaborate and analyse the facets of the end-user product together. New digital technologies are transforming the lighting industry and 'disruption' has been a key talking point among industry players.

Author: ILLUMINATION EDITORIAL BOARD





# UPDATES ON BIS STANDARDS

News from BIS technical committees ETD 23 'Lamps and related equipment' and ETD 49 'Illumination Engineering and Luminaires'



## Tunable and Dimmable Lamps

The Industry had sought clarifications from BIS on (a) whether LED bulbs with tunable and dimmable parameters are covered in IS 16102 and (b) how Colored LED lamps differ from tunable LED lamps

BIS clarified that to address (a), the clauses 10.1 and Clause 7.1 of IS 16102 Part 2, 2017 need to be referred. From these clauses it is clear that lamps covered in the specified CCT values and having variable color feature (tunable) will need to be tested after being adjusted / set to one fixed value as indicated by the manufacturer. Therefore, these lamps are covered under IS 16102 Part 2, performance standard.

BIS also clarified that Colored lamps are out of scope of IS 16102 and have CCT outside the defined seven values. These lamps are also mono-chromatic and are not tunable therefore such type of lamps are not covered under IS 16102.

In respect to the applicable regulations, both these types of lamps are covered under CRS (safety). Tunable and dimmable lamps are covered under BEE star labelling scheme but colored lamps are not covered under BEE star

labelling scheme.

## Emergency Lamps / LED lamps with charging circuit and battery

In the previous meeting BIS had clarified that Self ballasted LED lamps with battery installed inside are not covered under the scope of IS 16102 as there is no provision of using a battery inside the lamp and therefore not covered under Compulsory Registration Order (CRO) of MeitY. However, due to increased sale of such LED lamps, the committee decided to cover such lamps under the scope of IS 16102. The committee decided to include relevant test requirements for battery and charging circuit from LUMINAIRES PART 5 PARTICULAR REQUIREMENTS SECTION 8 (EMERGENCY LIGHTING) and requested UL and ERDA to study in detail the requirements given in IS 10322 (Part 5 / Section 8) related to battery and charging circuit and switch over between emergency and normal mode etc which are applicable to these lamps.

## Revision of IS 10322 (Part 1) - Luminaires Part 1 General Requirements and Tests.

As per last ETD 49 meeting, the responsibility

for preparation of the draft standard was entrusted to small group consisting of UL, ELCOMA and Shri P K Mukherjee (expert in personal capacity). The initial draft prepared is based on the latest IEC 60598-1, edition 8.1, 2017. The draft is under final review of the small group and so far two meetings of the group have been convened. At least two more meetings are required to complete the review of document.

## Adding IS 10322 Part 5 sections in reference to IEC

There are 7 sections in the IS standard, whereas there are 24 sections in IEC. The small group constituted for revision of IS 10322 series suggested that new sections for several important products may also be added in IS 10322 series. The process will begin with existing IEC which will be the base document to work with and the work to prepare the initial draft will be distributed amongst group members.

## National Lighting Code

The review of National Lighting Code (NLC) was assigned by ETD 49 committee to ISLE. Based on the initial study of 2010 version of NLC, ISLE submitted an R&D proposal seeking financial assistance from BIS for preparing draft revision documents for NLC. The proposal was discussed during special meeting of ETD 49 held on 16th May 2019 and was chaired by Ms. Saswati Mazumdar, Chairperson ETD 49. The committee accepted the ISLE proposal and names of working group members were finalized as proposed by ISLE along with names of review committee and also a timeline of 6 months was fixed to develop the first draft.



# ABSTRACT ACRYLIC LED NIGHT LAMP

This handmade 3D illusion LED lamp will visually emphasise the interior of your room or creative space. The acrylic part of the lamp is laser cut and laser engraved and then inserted into a wooden base. Its hidden LEDs are powered by one 9V battery and there are no cables.



## INDUSTRY NEWS

### LED STREETLIGHTS IN BENGALURU BY 2021

The city of Bengaluru will soon have brightly illuminated streets at a lower cost as the lighting project by Bruhat Bengaluru Mahanagara Palike (BBMP) to install LED bulbs has been approved by the government.

There are around 4,70,648 street lamps in Bengaluru for which BBMP pays a monthly bill amounting to Rs 12 crore. After the lighting upgrade has been accomplished, BBMP will be saving Rs 3.5 crore every month. It is expected that by the end of 2021 all the street lights in Bengaluru will have LED bulbs.

As per BBMP, the bidders will look after the maintenance of the street lighting system for the next ten years before handing it over to BBMP. However, the new lights would need no maintenance for seven years. Centralised control rooms will be set up which will aid the civic body to monitor LED street lamps.

The light poles will be redone, with their height being adjusted as per the road condition and the requirement to provide uniform brightness across the city



### LED EXPO MUMBAI – 9-11 MAY 2019

The LED Expo in Mumbai held between 9-11 May 2019 was focused on Energy Efficiency through the use of LED lights, lamps and luminaires. Lending his support to the Expo, Sh. Chandrashekhar Bawankule, Honourable Minister of State for Energy, Government of Maharashtra said that “LED based household lights could reduce energy consumption by 88% (as compared to ordinary bulbs) and 50% (as compared to CFLs). In order to promote the use of LEDs in residential areas, EESL in consultation with BEST and MSEDCL has proposed the DELP (Demand Side management based Efficient Lighting Program) in the state of Maharashtra.”

He also added that “Our country has seen a considerable progress in the field of lighting technologies and through schemes like UJALA and SLNP, the government has promoted mass production, distribution and usage of LED bulbs. LED Expo Mumbai 2019 will give a great impetus to buyers and companies in the western regions of India to update themselves with various applications which are energy efficient, cost saving and environmental friendly.”

**LED** expo  
MUMBAI

### CREE COMPLETES SALES OF ITS LIGHTING BUSINESS TO IDEAL INDUSTRIES

Cree announced that it has closed sale of its Lighting Products business unit (Cree Lighting) to Ideal Industries. The transaction includes the LED lighting fixtures, lamps and corporate lighting solutions business for commercial, industrial and consumer applications.

Cree revealed the sales agreement of its lighting business with Ideal Industries in March. After selling Cree Lighting, the LED company announced its plan to invest US\$ 1 billion to expand its silicon carbide capacity to meet the growing demand for silicon carbide and GaN-on-silicon-carbide technologies. The company will use the proceeds from the sale to accelerate the growth of Wolfspeed, its Power and RF business, and expand its semiconductor operations.

Gregg Lowe, CEO of Cree, commented, “This represents a pivotal chapter for Cree as we sharpen our focus to become a semiconductor powerhouse in silicon carbide and GaN technologies. Cree’s technologies are helping to power major transitions in our economy, whether it’s the automotive industry’s transition to electric vehicles or the telecommunications sector’s move to faster 5G networks. Our leadership in silicon carbide and GaN positions us well to help customers improve performance and realize greater efficiencies.”

**CREE** 

# ESSCI READY TO SKILL LED INDUSTRY

ESSCI has developed special Qualification Packs and Courses for LED Industry and is keen to collaborate with LED Lighting Industry for creating skilled and certified work force pan India

India's LED lighting market stood at \$ 918.70 million in 2016 and is projected to grow at a CAGR of 24.66% to reach \$ 3,758.74 million by 2022, on account of increasing government initiatives to boost LED adoption and growing awareness regarding lower power consumption of LED lighting products.

To capture this demand and enable capacity building for the industries, ESSCI has developed various levels of Qualification Packs (QP) based on the Industry requirements



### Mechanical Assembly Operator - LED Products (ELE / Q9201 - NSQF Level – 4)

The Mechanical Assembly Operator assembles all parts of LED luminaire to complete the product. The worker at this job role fits together different electronic, electrical and mechanical parts and connects them to make the final LED luminary as per product design.

### LED Light Design Engineer (ELE / Q9101 NSQF Level – 5)

The LED Light Design Engineer is responsible for LED product conceptualization and designing. The individual at this job role conducts research, designs and develops LED driver and light engine system to create final LED product prototype for production.

### LED Light Design Validation Engineer (ELE / Q9102 NSQF Level – 5)

The LED Light Design Validation Engineer is responsible for verification testing of LED light product/s prototype created by LED light designer. This individual at work performs various tests on LED light product prototypes for validating its design and performance as per preset parameters.

### LED Luminaries Testing and Measurement Technician (ELE / Q9301 NSQF Level – 4)

The LED Luminaries Testing and Measurement Technician is responsible for testing LED luminaries using different testing equipment. The individual at work performs various tests on LED luminaire product to check specified parameters for verifying its performance against quality standards.

### LED Light Repair Technician (ELE / Q9302 NSQF Level – 4)

The LED Light Repair Technician is responsible for repairing/mending non-functional LED lights. The individual at work checks the non-functional LED light in a systematic manner to find out the fault; dismantles it; repairs the fault and reassemble the light to make it functional.

ESSCI has trained and certified more than 3000 candidates for LED Repair Technician across India as of Jun 2019. LED Mechanical Assembly Operator Training programs are being carried out in Delhi NCR and Bangalore locations.

Author: ESSCI

Views expressed in this article are those of the contributors and do not necessarily reflect those of the editors or publishers.

State	Certified LED Light Repair Technician
Andhra Pradesh	31
Bihar	55
Gujarat	99
Haryana	67
Maharashtra	22
Madhya Pradesh	1486
Rajasthan	500
Tamilnadu	15
Uttarakhand	170
Uttar Pradesh	753
West Bengal	216
<b>Grand Total</b>	<b>3414</b>

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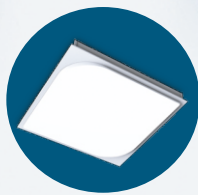
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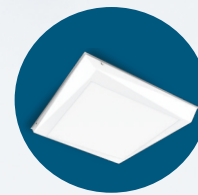
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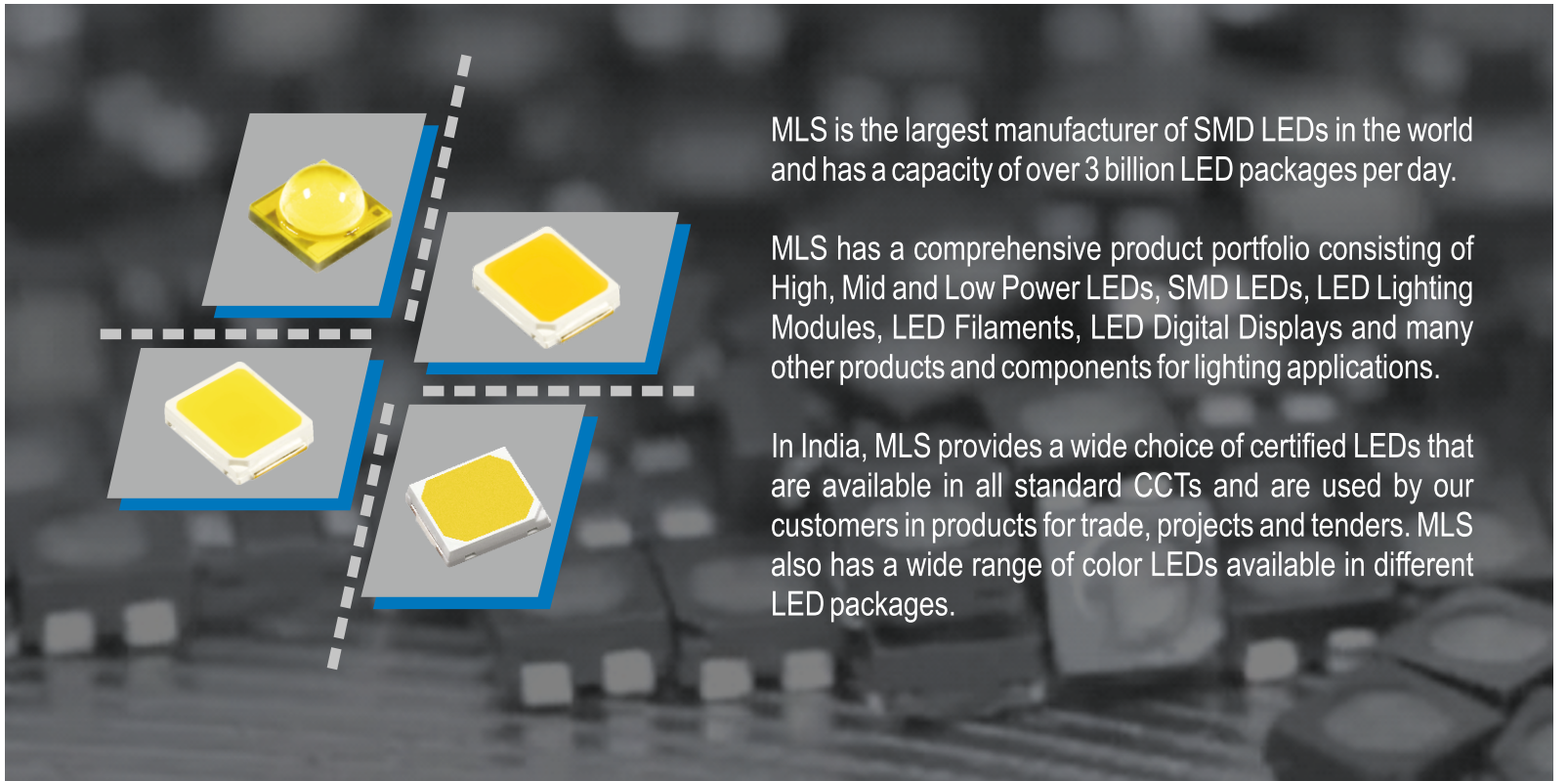


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