

# IllumiNation

JUL - SEP 2020

THE LIGHTING MAGAZINE

## SIGNIFY'S COLOR KINETICS LIGHT UP THE HOWRAH BRIDGE



*50 Years of Elcoma in India*

ELECTRIC LAMP & COMPONENT MANUFACTURERS' ASSOCIATION OF INDIA

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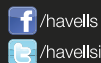
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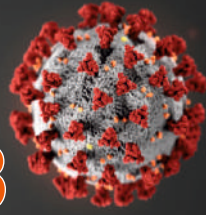
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## CONTENTS

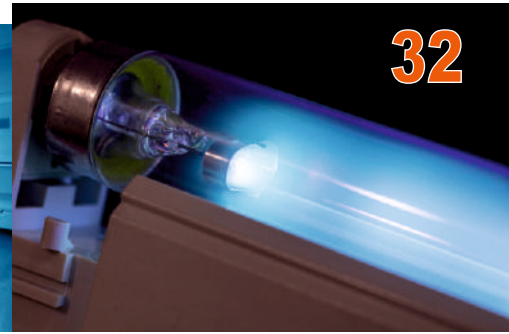


10

28



36



32

### CAPTAIN SPEAKS

- 10** SUNIL VACHANI, DIXON TECHNOLOGIES :  
INDIA SET TO BECOME THE EXPORT HUB FOR LIGHTING  
PRODUCTS

### CHAT TIME

- 14** CHATTING WITH ANUJ PODDAR, EXECUTIVE DIRECTOR,  
BAJAJ ELECTRICALS LIMITED



### COVER STORY

- 18** KOLKATA'S ICONIC HOWRAH BRIDGE  
SHINES IN ALL ITS GLORY



### FEATURE STORY

- 28** THE IMPACT OF COVID-19 ON  
INDIAN LIGHTING INDUSTRY
- 40** ELCOMA PILOT PROGRAM  
FOR SAFE DISPOSAL OF CFL

### SPECIAL FEATURE - *50 Years of Elcoma in India*

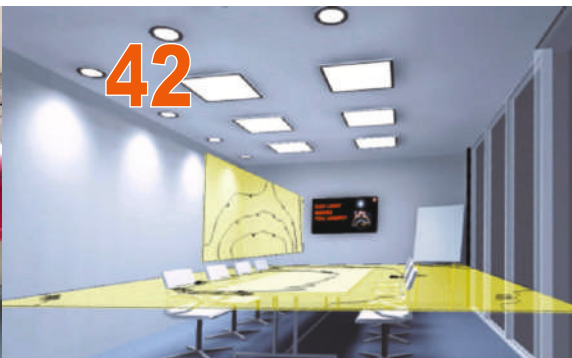
- 22** CELEBRATING 50 YEARS OF ELCOMA
- 24** ELCOMA HALL OF FAME
- 26** THE INDUSTRY CONGRATULATES ELCOMA ON  
ITS GOLDEN JUBILEE

### TECH CORNER

- 32** ULTRAVIOLET RADIATION PRIMER
- 34** UV-C GERMICIDAL IRRADIATION
- 36** DELHI AIRPORT USING ULTRAVIOLET DISINFECTION  
TECHNOLOGY TO FIGHT CORONAVIRUS
- 36** APPLICATIONS FOR UV-C  
GERMICIDAL IRRADIATION (UVGI)
- 38** ELCOMA UV TASK FORCE
- 39** HUMAN CENTRIC LIGHTING :  
LIGHTING FOR THE FUTURE
- 42** LEDVANCE FIRST COMPANY TO RECEIVE  
NEW VDE QUALITY CERTIFICATE FOR  
HUMAN CENTRIC LIGHTING (HCL)

### PRODUCT SHOWCASE

- 43** SIGNIFY LAUNCHES TWIN GLOW BATTENS
- 43** BAJAJ ELECTRICALS LAUNCHES  
SUNSHINE CRI PLUS RANGE (CRI>90)  
IN B2C SEGMENT
- 44** HPL ELECTRIC LAUNCHES KASPER INVERTER LAMP
- 44** MAGIK PRISM PLUS LED BATTENS



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## ELCOMA COMPLETES 50 YEARS

**W**ell before the Honorable Prime Minister Sh. Narendra Modi made the clarion call for India and the Indian Industry to become “Atmanirbhar”, or self-reliant, ELCOMA had already prepared a blueprint that would enable the Indian Lighting Industry to make at least 80% of all LED products in India in coming two to three years. At present LED lamps and TLED have only about 40% Indian components. Similarly LED Luminaires have about 50% of Indian components. The Indian Lighting Industry is aspiring to change this to 80% of India-sourced components well before the end of 2022.

ELCOMA members have also decided to push for exports in large numbers, so as to enable exports exceeding 40% of their total manufacturing capacity. Slowly this should increase and in the next few years, we should be able to export more than Indian consumption and then target to make India as one of the largest exporters of Lighting products outside China.

Due to the COVID-19 pandemic, the demand for UVC lamps has suddenly grown. To apprise the industry and consumers on various types of UVC lamps, their usage, safety and standards, we have constituted a core committee to discuss all these issues and prepare India specific standards with close participation of global associations like GLA and ISA.

ELCOMA completed its 50 years on 29th June 2020. Though elaborate arrangements were planned to celebrate this event, but due to COVID-19 we had to postpone most of these events. Instead ELCOMA hosted a video call, which was attended by the entire lighting community in India.

To celebrate this event, we have prepared a “Wall of Fame” covering all ELCOMA office bearers from 2003 till date that is part of this edition of Illumination.

Once again I would like to congratulate all members on the completion of 50 Years of ELCOMA and wish that the industry continues work together like a family for many more years to come.

Best wishes

**SHYAM SUJAN**

Secretary General

Electric Lamp and Component Manufacturers Association of India (ELCOMA)



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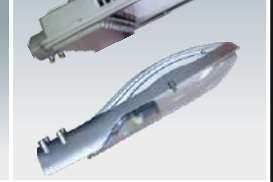
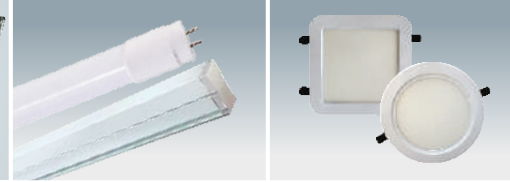
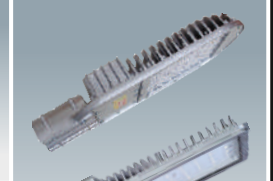
# LED

- LED Luminaires for both Indoor & Outdoor Lighting
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## LIGHTING MANUFACTURING TO BECOME SELF-RELIANT

**W**hen the previous issue of IllumiNation was released, the COVID-19 pandemic had just started in India. Though it has been a tough few months, but India today stands stronger and our economy is raring to bounce back. Despite the ongoing global economic slump due to pandemic, our Foreign Reserves have crossed over US\$500 billion showcasing how the fundamentals of our economy have remained strong.

Like every other sector, Lighting Industry in India too came to a virtual halt due to the pandemic lockdown. Heavy reliance on imports in the past, when contrasted with Hon'ble Prime Minister Narendra Modi ji's call for Aatmanirbhar Bharat, may seem like a challenge at first, but I can sense a golden opportunity for our industry too.

It is high-time that the Lighting Industry in our nation should adopt and implement the idea of self-reliance and start the manufacture of all lighting products in India, end-to-end. The electronic component industry, along with the government must come up with definite actionable plans to cut-down our dependence on imports for electronics and look for opportunities to put into practice the vision of 'Make in India'.

Thanks to various pro-business measures taken by our government, easy availability of new loans, support to new investments and a more liberal tax regimen, I am confident that our lighting industry can, and will make rapid advances in the direction of attaining 'Aatmanirbharta' (self-reliance).

This year also happens to be the 50th anniversary of ELCOMA. Though we were unable to organize a large-scale event, I as the President of ELCOMA, thank everyone from the Indian Lighting Industry who took time to connect with one another through video conference to mark the occasion.

I would like to extend my best wishes to the entire lighting community and all our members on the 50th years of ELCOMA, and wish for a quick revival and great success for the entire industry.

Best wishes

RAJU BISTA  
President, ELCOMA





# Intelligent Street Light Solution

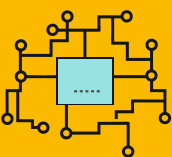
Smart Solutions for Smart Cities



## Street light controlling with / without dimming

It utilizes 6LoWPAN communication standard over sub 1 GHz wireless communication helping to monitor and control every individual luminary. It supports multiple Broadband communication network connectivity over GSM / GPRS, Ethernet and Wi-Fi for server end connectivity

- Metallic / SMC Enclosure
- In built external > 20KA SPD
- Door Open Detection
- Ability to Control each light independently.
- Ability to monitor each light burning hours independently
- Powerful measurement module (energy consumption, active power, power factor, current and wattage)
- Monitoring lamp status (malfunction detection and reporting) – lower servicing cost
- Flexible and centralized network
- Structure – better functionality and reliability
- Installation at a lamp fixture



Electrical Design



Networking



Monitoring & Controlling

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# INDIA SET TO BECOME THE EXPORT HUB FOR LIGHTING PRODUCTS

In conversation with Sunil Vachani, Chairman, Dixon Technologies India Limited,  
on the success story behind the largest EMS in India

**Dixon has been manufacturing in India since 1993. Please take us through the journey so far.**

Dixon started its journey in 1993 with a single rented premises at Noida and the first product to roll out of the factory was CRT televisions. At that time the concept of outsourcing electronics manufacturing was at a very nascent stage but the founders believed that it would become a growing trend going forward and having faith in that the vision the company forayed into newer segments such as VCR, Video game consoles, push button telephones and many more such products. Due to our relentless focus on customer satisfaction and delight the company was catering to some of the biggest names in the industry such as Philips (VCR), SEGA (Video games), AT&T (Phones), LG (CRT televisions) to name a few. The group now has 8 state of the art manufacturing locations spread across the states of UP, Uttarakhand and Andhra Pradesh. Dixon and its group companies have a combined turnover of over 4500 crores manufacturing across a wide range of product verticals such as Mobile phones, LED televisions, indoor and outdoor lighting products, home appliances, security systems and medical devices.

*“Going forward we feel that India will emerge as a hub for manufacturing of lighting products not only for the domestic market but also for the global brands in the world”*

**Dixon started with manufacturing televisions and then added LED Lighting. You are now manufacturing for several verticals including mobiles. What drove the diversification of Dixon to these different verticals?**

The company was initially dependent on a single product category which was televisions for a very long time. The management realised the need to de risk the company strategy by getting in to different product verticals without giving up on the core philosophy of scalability, backward integration, offering self-designed solutions and not competing with the customer.

The company has been able to emerge as the leading manufacturer in the EMS space of lighting products and this is due to the trust and faith of the customers. At Dixon we continuously strive to further increase the level of trust and faith of our customers by relentlessly focusing on quality, reliability, cost effective self-designed solutions and customer delight.

**A few years ago the company went public and the issue was well received. What prompted that move and what has changed at Dixon after that?**

The company strongly believed that India would emerge as a hub for manufacturing of ICTE products and the company would need to raise resources to fulfil the aspirations of becoming a global leader in electronic manufacturing services. To achieve this objective and also to give a profitable exit to the then private equity investor/s we decided to go public.

Ever since the company has gone public the level of responsibility and accountability has increased manifold and along with that it has also opened up huge avenues for growth and scalability. Also thanks to the ESOP scheme which was launched many years back many of our employees have become shareholders/owners of the company which was one of the cherished dreams at the founding stage of the company.

**Do you believe that EESL Tenders have been a boon or a bane for the Indian industry?**

I think the EESL tenders helped Dixon and the country build a scale in manufacturing of LED lighting products due to which Indian Lighting Industry can be globally competitive given the right inputs from the Government of India. Going forward we feel that India will emerge as a hub for manufacturing of lighting products not only for the domestic market but also for the global brands in the world.

**Is the Indian Lighting industry truly promoting “Make in India”? What part/percentage of the products that you manufacture for Indian Lighting Industry are India sourced?**

I feel that lighting industry was one of the first industries to support and promote Make in India. It is due to this effort of the industry captains and ELCOMA that almost 95% of the domestic consumption is met through locally manufactured products. There is also a high level of localisation with almost 50% of inputs being sourced locally. Going forward we feel that because of the scale and the backward integration, India will emerge as a hub for export of Lighting products.

**LED being easier than CFL to assemble, hundreds of new traders/ manufacturers have forayed into manufacturing of LED products. What is your opinion about such small operators?**

As an industry we should welcome many manufacturers to get into the area of LED lighting products but as long as they do it ethically and legally. As an association and industry we should discourage the grey market for lighting products which has mushroomed all over the country and it is a huge menace to the growth of organised players and also a source of loss of revenue for the Government of India

**Do you think that in the future a large part of the Indian Lighting Industry products would be completely “Made in India”? What kind of support do you think that the**



### **Government should provide to promote Manufacturing in India?**

I feel going forward almost hundred percent of the local consumption of lighting products will be met through domestic manufacturing. We shall also have a strong component ecosystem with many small and medium enterprises setting up manufacturing of components for Lighting products. We look forward to the Government of India to help the industry build scale and a strong component ecosystem along with taking care of the disabilities that make exports from India uncompetitive. We should also request the government of India to introduce a production linked incentive scheme which has been introduced for manufacturing mobile phones. This could be a game changer in building a strong lighting industry in India.

### **At a personal level, what drives you to achieve success?**

What drives me and gets me really excited is a strong desire to make India a superpower in the ICTE sector and to see my employees (my extended family) grow along with the company and other stakeholders. What has been most

gratifying for me in the entire journey is that no customer has ever left or parted ways with Dixon and it is my hope and desire that we continue to relentlessly focus on strengthening our customer trust and focus.

### **How do you unwind after a hectic day or week at work?**

I was fortunate to go for a short program at the Isha Ashram in Coimbatore which was the start of my spiritual journey and I spend a lot of time on practicing the kriyas taught to me by Isha which helps me focus, unwind and enjoy the journey called 'life'

### **What kind of food/cuisine do you like?**

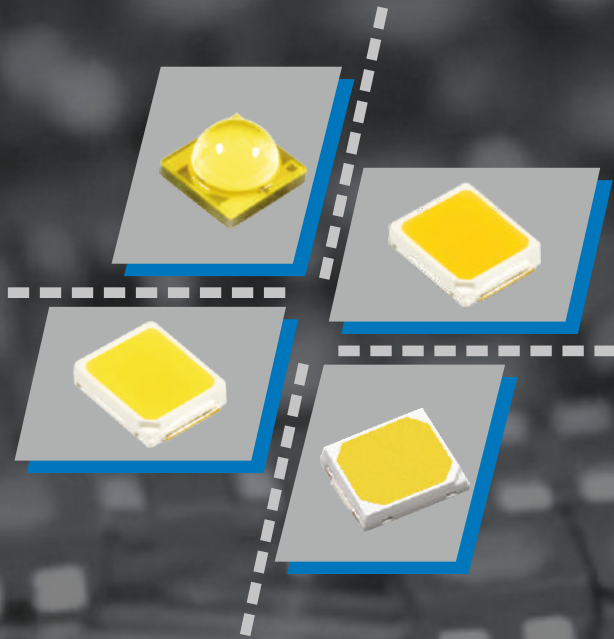
My favourite cuisine is Japanese after my home cooked Indian vegetarian meal

### **Which book/s have you recently read?**

I recently read this very interesting book called "The future is faster than you think" by Peter Diamandis who is one of the co-founders of Singularity University and the book talks about the new and exponential technologies which could disrupt our life and our business.

**AUTHOR: ILLUMINATION EDITORIAL BOARD**

*"...the government of India should introduce a production linked incentive scheme which has been introduced for manufacturing mobile phones. This could be a game changer in building a strong lighting industry in India"*



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In India, MLS provides a wide choice of certified LEDs that are available in all standard CCTs and are used by our customers in products for trade, projects and tenders. MLS also has a wide range of color LEDs available in different LED packages.

# NO. 1

The largest LED packaging company in the world

**25,000+**  
Employees worldwide

**TOP 3**  
Lighting company

**4bn USD**  
Group Revenue

**3,000,000,000**  
3 Billion LED packages per day

## MLS INDIA PRIVATE LIMITED

# INNOVATION AND NEW TECHNOLOGIES WILL DRIVE INDIAN LIGHTING INDUSTRY

In conversation with Anuj Poddar, Executive Director, Bajaj Electricals Limited  
on how the company is charting its future

**Before joining Bajaj, you were one of the core team members at Viacom18 for more than a decade. What made you move to Bajaj Electricals?**

I would say 3 factors made me decide. The opportunity to create immense value – it's a company with great legacy but a lot of potential waiting to be further unlocked. The challenge of steering a large ship and doing so in a very competitive marketplace. And finally, the comfort of being part of a group with impeccable governance and values.

**Bajaj was one of the first few Indian entities to venture into the lighting space. How have the last few decades changed the lighting industry and approach to business in India?**

In the last few decades, the industry has undergone different stages of transformation. However, energy efficiency has become the cornerstone of all new developments in this field. The first major change was seen when sodium vapour lights came into prominence and changed the face of the lighting industry. These lights transformed the outdoors completely. The streetlights were illuminated with these products and were in use for a long time.

Another major change that came within the sector was the usage of the LED chip. The LED has been in the industry for a long time and is not a new concept. It is a 40-50 years old technology, which was used initially for indicator lights. Today, it is visible and operational in the complete spectrum and the entire industry has adopted the technology. I believe this was one of the greatest innovations that have provided the impetus for our industry's growth.

**What is the Roadmap for Lighting at Bajaj Electricals?**

The Indian lighting industry has undergone various stages of transformation and evolved into an extremely adaptable and successful industry. In my opinion, over the years, the industry has matured enough to be self-reliant and experienced enough to cater to the various requirements of the industry. I believe the sector will get more organised in the

coming times.

Being the pioneers in the lighting segment, we aim to spearhead innovation and introduce new technology to all the upcoming Smart Cities and provide leadership to the industry. We have a very strong presence in outdoor lighting and continue to improvise in the indoor lighting segment. Smart Indoors and Connected Outdoors will continue to be the driving force for us.

**How is Bajaj Electricals looking to address the opportunity offered by Connected Lighting / Intelligent lighting space?**

The conversation about connected lighting has been a trending topic for quite some time now. Being the industry leaders, we brought into focus the concept of connected lighting in 2010. Back then, the concept was in a very early stage and the end consumer was still not receptive to the idea. But today, it is being implemented intelligently across sectors. Smart lighting is now a universally accepted theme and has been integrated and adopted wholeheartedly.

The conversation today is not just about connected or intelligent lighting, but smart solutions for smart cities where intelligent lighting is an integral part. Hence, the focus is on the adoption of technology that will cater to the demands of the new-age customer who desires for products that are not only energy-efficient but also aesthetically appealing and smart.

**What kind of product portfolio are you planning in the Connected Lighting Space?**

At Bajaj, we are looking at creating products that are smart and energy-efficient. Our focus is to build connectivity of light points by creating Human and Nature Centric Lighting, which brings comfort to the people through optimum Illumination. Additionally, these light points integrated with various sensors are being used to generate real-time data of the building/street or any such applications, which helps to generate data analytics. Citisol & Building Manager solutions from Bajaj Electricals aims to deliver Smart Outdoor & Connected Indoor Lighting solutions by

*“The focus is on the adoption of technology that will cater to the demands of the new-age customer who desires for products that are not only energy-efficient but also aesthetically appealing and smart”*

providing a personalised experience and creating possibilities for the ever-evolving human aspirations. Under our consumer product portfolio, we have already launched Bajaj AWE LED Lamp, which is a smart product focusing on wellness using the Bluetooth platform. We are also planning a full range in Lamps, Batters & Downlights based on IoT platform.

**Do you believe that Human Centric Lighting has a market in India? In the future where do you see HCL applications being used?**

Human Centric Lighting has been recognised as one of the most awaited lighting innovations and is part of the **WELL Building Standard** (the international reference for interiors and buildings that focus on health and wellbeing). We at Bajaj Electricals, are set to touch human lives with our newly developed Human Centric Lighting (HCL) system which is dynamic and operates as per the human requirements to enhance productivity at the workplace, better and faster healing for patients at hospitals/medical institutes (healthcare) and increased student attention span at education spaces.

The entire application is mobile-based and comes with a smart lighting integration. I

believe this entire concept of HCL to be a game-changer and a new way of designing and using artificial lighting, which is as dynamic as natural light.

**Would you like to comment on the role played by EESL in the emergence of LED technology in Indian lighting industry?**

Any industry which is on the path of growth and evolution is bound to experience challenges. However, there is another perspective which hasn't been much spoken about. EESL was introduced with a lot of promise. The potential that EESL offered attracted a large number of players to this sector who envisaged a 35-40% CAGR. As the new players came in, there was a price war as all of them rushed to tap the market. Accelerated adoption was brought in by EESL and has helped in reducing the cost of manufacturing, which in turn meant that the end consumer got a quality product at a competitive price. We see a very bright future in this segment.

**It is estimated that a large number of products being sold in India are non-compliant (non-BIS certified) products. How does this impact Bajaj and what kind of advocacy would you recommend going forward?**

The LED market in India is fragmented with the easy availability of non-branded products. These products greatly influence those customers who are on the lookout for lower initial investment rather than the total cost of ownership. Also, the new, unorganised players who have entered the LED business are managed fly-by-night operators with very little understanding of the business, and this has impacted the organised players who are forced to compete with them on price. Cheaply priced and low-quality LEDs available in market draw customers who only look at the price. Such kind of non-standard and low-quality products pose serious safety hazards for the consumers besides causing a significant loss in tax revenues to the Government.

BIS (Bureau of Indian Standards) is taking all necessary efforts to bring in standardisation

across the industry. However, in this ever-evolving market and technology spectrum, serious enforcement measures must be deployed to ensure standardisation and safety guidelines. It is a crucial factor not just for the product manufacturers, but also for the end customers.

**The Indian consumer behavior in the last decade or so has changed a lot. How has this effected your product portfolio and sales channel?**

Over the years, there is a stiff shift in brand loyalty for B2B space and customers are continuously exploring new opportunities. In these disruptions, fulfilling customer's needs & creating a delight for them are the key game-changer. With the evolution of government-backed initiatives like EESL and GeM, there is an impact on traditional sales channels. To align with the evolving consumer sentiments, we too enhanced our portfolio from the standard luminaire products to value-driven unique segmented solution offerings which provide an enhanced value proposition to the customers.

We are deploying new value-added offerings such as Building Architectural - Facade Lighting, Connected & Human-centric personalised lighting solutions along with structures like various High Masts and poles along with providing quick & long-term lifecycle services. These value chains are agile and responsive to the evolving needs of the customer.

For B2C products, the consumer preference is shifting towards better brightness, energy efficiency & product durability. Also, in most modern urban homes, the number of light points has increased significantly. In the last 2 years, we have made significant changes to our portfolio in order to cater to the changing requirement of modern homes.

**The COVID-19 pandemic has ravaged industries and businesses around the world. What has been the impact of COVID-19 pandemic at Bajaj Electricals?**

The COVID-19 global pandemic followed by the subsequent nationwide lockdown has impacted industries across levels including

*“Accelerated adoption was brought in by EESL and has helped in reducing the cost of manufacturing, which in turn meant that the end consumer got a quality product at a competitive price”*



us. For the initial two months of lockdown, we witnessed almost negligible sales. However, we recalibrated our strategy and utilised the opportunity of Work from Home to impart training to our employees as well as our dealer network with the help of digital tools. Later, with the ease in lockdown in certain zones of the country, many of our branches and warehouses have started the operations and are active now.

**How is Bajaj Electricals looking to overcome the impact caused by the COVID-19 pandemic.**

The unprecedented times due to the ongoing pandemic have allowed us to realign and enhance our go-to-market strategy. Digital platforms have helped us to connect with our employees and adapt to the dynamics of the situation. For our consumer products business, we are strongly banking on our unique distribution model of RREP (Range Reach Expansion programme). Apart from our distribution model, we have focused on strengthening our e-commerce offerings and we expect this channel to contribute significantly to our revenue in the coming quarters. Our focus is to create digital applications that will facilitate contact-less

sales operations and services.

**By when do you believe the sales in India return to normal levels? Will customers be back soon?**

Since lighting is an essential commodity for every individual irrespective of the external environment, we see a robust demand going forward, especially with the beginning of the festive season in Q3. Several relevant changes in the government policies with a focus on increasing the infrastructure spending will also benefit the lighting industry.

**Would you like to share an anecdote or incident related to your career that has been inspiring or life-changing for you?**

There are many. Especially during my stint with Arthur Andersen, which set the foundation for my career. We were constantly thrown at the deep end of the pool and had to swim on our own. Very tough client situations that we had to solve. Impossible deadlines which we always had to meet. And an ode to perfection and detail, that was drilled into us. The other key, specific milestone that I would like to mention is the setup of Viacom18. I had joined MTV Networks, which was a miniscule business in the Indian media landscape and

was tasked with strategising its scaling up. The audacity of working on the plan to transform that into one of India's most powerful media & entertainment conglomerates and making Viacom18 actually happen through all the obstacles – I believe that has been a life-changing experience.

**IN A LIGHTER VEIN**

My Family : is precious to me

How I pass my free time : What free time?

Favourite movie : Andhadhun

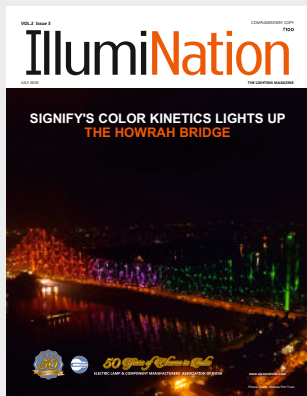
Favourite Food : Indian Chinese (I think we are completely 'atmanirbhar' in this)

Hobbies : I have many – travel, Pink Floyd, furniture, photography, English sitcoms

Favorite Holiday Destination : European countryside or US national parks

My biggest inspiration & idols : Rahul Dravid, Barack Obama

AUTHOR: ILLUMINATION EDITORIAL BOARD



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# KOLKATA'S ICONIC HOWRAH BRIDGE SHINES IN ALL ITS GLORY



The historic bridge that connects Kolkata to Howrah becomes a modern marvel with dynamic lighting from Signify

Picture Credit - Kolkata Port Trust



Picture Credit - Kolkata Port Trust

**H**owrah Bridge or Rabindra Setu, the lifeline of the culturally affluent city of Kolkata, was named after the famous Bengali poet, Rabindranath Tagore. The third-longest cantilever bridge at the time of its construction in 1943, it is still the sixth-longest bridge of its kind in the world. Once an engineering marvel, the bridge that stretches 2150 ft over the Hooghly river and ferries over 100,000 vehicles between Kolkata and Howrah daily, is now also synonymous with West Bengal's identity.

The bridge's storied past is of great significance to the residents of Kolkata and its magnificence attracts many tourists from around the globe every year. It's also a pop culture icon in its own right. The bridge lent its name to Shakti Samanta's 1958 popular film and has guest starred in countless others. Howrah Bridge's breathtaking beauty and matchless brawn has always kept it in the limelight.

The attention it draws, however, means that the iconic structure must always be in its best form and shape. Signify Innovations (Previously Philips Lighting) has kept it glowing since 2006. It's latest project, which upgrades the bridge's existing lighting system from conventional light to LED, covered

everything, from viewing angles and CO<sub>2</sub> emissions to glare and distance, to give Howrah Bridge a new shine.

The main objective behind Kolkata Port Trust's request for upgrade was to reinvent this landmark and elevate an ancillary location, Millennium Park at a distance of 2 kilometers, to be its viewing deck. This meant that while the lighting control was placed at the bridge control room, the sound equipment was placed in the park and both the systems had to be in sync for a superlative viewing experience. Kolkata Port Trust was looking to transform it into a tourist destination that would come alive with a light and sound show, at a pre-determined time every day, bringing its admirers joy. Another critical requirement was to substantially reduce the maintenance and energy costs of the installation.

Taking all lighting requirements into account, Color Kinetics lighting system with 650 dynamic colors LED light points, was used for illumination that highlighted the structure's impressive design. The system was based on KiNET protocol, which is used to control high-power LED luminaires for generating various lighting schemes. These luminaires are capable of producing 16 Million colors and can switch between hues in less than 0.01 sec.

This system also enabled reduction of CO<sub>2</sub> emission from 101.905 kg CO<sub>2</sub>e to 37.304 kg CO<sub>2</sub>e. And most importantly the new LED system was able to improve energy efficiency by 63% leading to significant savings.

This installation also features an option of programmable light shows that can be synced with music, adding more gleam and glow to the bridge, making it even more attractive for tourists and locals alike in the evening hours. The previous lighting system with conventional lighting technology, had the option of three vivid complex combinations of light and music coming together to create a splendid show, also known as lighting scenes. These were an energy saving scene, a daily scene and a distinct weekend scene ensuring the audience had something new to look forward to each time. This new installation, however made possible a great degree of flexibility of multiple lighting scenes including a daily scene, weekend special scene, special festivals scenes, and the freedom to design new scenes for social messaging on various relevant occasions.

The 2.5-minute light and sound show was inaugurated by Prime Minister Narendra Modi on January 11th, 2020 at an event to celebrate Kolkata Port Trust's 150th anniversary.



Picture Credit - Kolkata Port Trust

*“We at Signify are committed to transforming monuments in an eco-friendly manner by enhancing their beauty with our energy efficient lighting solution”*

Sumit Joshi,  
Vice Chairman and Managing Director  
Signify Innovations India Limited

Recently on the occasion of International Day of Light celebrated on May 16, 2020, the bridge put up a special light show to honor COVID warriors and send a message of peace and hope to the world amid the pandemic.

Speaking at the launch, Sumit Joshi, Vice Chairman and Managing Director, Signify Innovations India Limited, said, “We at Signify are committed to transforming monuments in an eco-friendly manner by enhancing their beauty with our energy efficient lighting

solutions. Our LED lights will enhance the aesthetic appeal of the iconic Howrah bridge, which is also one of the key attractions of the City of Joy. This project joins the ever-growing list of cultural landmarks illuminated with our Color Kinetics lighting system such as the Rashtrapati Bhavan, Qutub Minar, Parliament House, India Gate, Somnath Temple and North & South Blocks of Central Secretariat, amongst many others.”

Whether it is bridges, monuments or facades of iconic buildings, Signify enables city authorities to create memories with advanced architectural lighting. A well-lit structure such as Howrah Bridge not only enables citizens and visitors to take away a lasting impression of the city, but also enhances these structures and cultural heritage in an exciting and inspirational way.

**AUTHOR: SIGNIFY INNOVATION INDIA LIMITED  
(FORMERLY KNOWN AS PHILIPS LIGHTING)**

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



Picture Credit - Kolkata Port Trust

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India Gate, New Delhi



Gateway of India, Mumbai



Howrah Bridge, Kolkata

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# CELEBRATING 50 YEARS OF ELCOMA

A report on the 50 year celebration of ELCOMA held on 29 June 2020

On 29th June 2020, ELCOMA completed 50 years of its existence. Though extensive celebrations and events had been planned to be carried out to mark the occasion, due to the current COVID-19 situation, all these events have had to be postponed or cancelled. ELCOMA members who were joined by past ELCOMA members and office bearers, celebrated the Golden Jubilee of ELCOMA over a Video Conferencing call.

Mr Shyam Sujan, Secretary General of ELCOMA, kicked off the event by talking about the time when he joined ELCOMA in 2004. At that time, ELCOMA's office consisted of a single seat in a shared office space with a lighting manufacturing company in Defence Colony, New Delhi. Talking about the progress made in the last decade and a half, he said that ELCOMA now operates out of a large dedicated office in one of the prime business districts of Delhi.

Mr Sujan welcomed all the ELCOMA Members who had joined the conference call and especially thanked all the former ELCOMA office bearers that attended the meeting including Mr. Nirupam Sahai, Mr. Gagan Mehra, Mr CGS Mani, Mr. Nandakishore, Ms. Bhavna Kasturia and Mr. R. Bharanitharan. He also paid homage to those departed colleagues that were no longer with us today such as Mr. J.B. Kansal, former Secretary General of ELCOMA, Mr. Nijhawan and Mr. S. R. Anand. A special mention was made of Mr. H. S. Mamak who gave impetus and lead ELCOMA for many years and was considered the father figure of the entire Lighting Industry. A tribute was paid to them by playing of the Gayatri Mantra for two minutes.

Mr. Raju Bista, President, ELCOMA, welcomed all present and remarked that the occasion, which was to be celebrated in a grand way, could not be carried out due to COVID-19. He did promise all those present

that once the COVID-19 pandemic would be over, a grand celebration would definitely be organized. He said that "50 years is a very long period for an organization to sustain in a very harmonious way. The members of the association are like a one large family".

Mr. Sunil Sikka, advisor, ELCOMA and former President of ELCOMA, reminisced about the good old days of Lighting Industry in India, when there were few players in Lighting, but a very healthy competition existed amongst the sales personnel. Many salespersons of different companies, often travelled together to various towns and cities since they had common distributors or stockists.

Mr. Shekhar Bajaj, Chairman & Managing Director, Bajaj Electricals Limited, who has been associated with ELCOMA for the last 40 years and also served as its President in 2004, congratulated the association on behalf of the entire lighting industry. Paying homage to the founders of ELCOMA he said "we were very fortunate to have Shri H. S. Mamak associated with ELCOMA. He had earlier worked with Philips and he played a very important role for the Indian Lighting Industry by creating a very good relationship with the government that helped the industry in many ways. He also initiated various lighting shows where people from all over the world participated. This gave us an opportunity to get the latest technology and therefore we were very much updated in terms of new Technology."

Mr. Mohit Sharma, Global Business Head / CEO - Lighting, Jaquar & Company Private Limited said that "When we talk about ELCOMA, we synonymously talk about Mr. Mamak and Mr Sujan, who have set very high standards for ELCOMA. Guided by Mr. Mamak's vision of a single, powerful, representative body for the Lighting Industry in India, it has been Mr Sujan's drive over the last 16 years which has been able to make this association a platform for the industry at all

levels. Government bodies, ministries, national and international compliance bodies, international lighting associations and forums, local manufacturers of all sizes, testing bodies, etc – all stakeholders have developed a great respect for ELCOMA"

Mr Anil Bhasin, President, Havells India Limited also congratulated ELCOMA on the completion of 50 years and thanked the association for becoming the common forum where the industry can discuss their problems and some of the issues that need to be highlighted to the government or the other concerned bodies.

Mr. Sumit Joshi, Vice President, ELCOMA congratulated everyone and wished that ELCOMA continues to serve the industry for another 50 years and beyond.

A commemorative video created specially for the occasion was streamed over the video conference and much appreciated by all present. Mr Shyam Sujan Invited few members to recall their association with ELCOMA and among them Mr. Gagan Mehra, Mr. C. G. S. Mani and Mr Nirupam Sahai spoke about their experience with ELCOMA and its members.

The closing the ceremony was performed by Mr. Avinder Singh, Treasurer, ELCOMA, who thanked all those who had joined including present and past members and thanked ELCOMA for having organized the event. He congratulated all the members on completion of 50 years of ELCOMA and said "Huge complements and congratulations to ELCOMA for completing 50 years and I sincerely wish that for the next 50 years also ELCOMA continues to do what it has been doing - bringing everyone together, bringing everyone on the same platform."



(( Si ))

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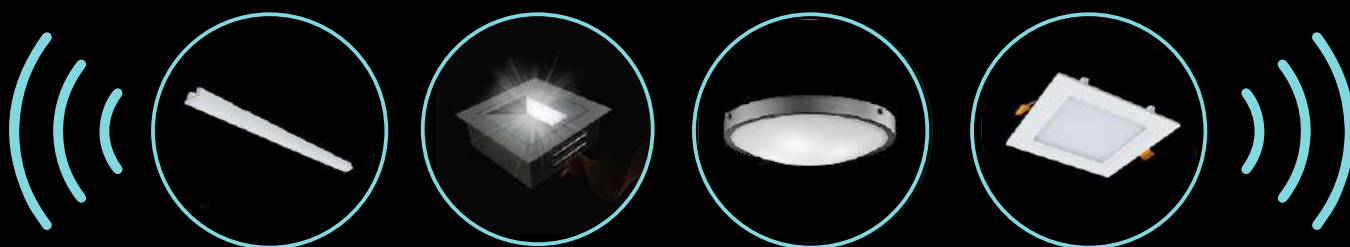
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# ELCOMA HALL OF FAME



**A.D. Kulkarni**  
President (2003-04)



**V.R. Mujumdar**  
Vice President (2003-04)  
Treasurer (2004)



**Vineet Agrawal**  
Treasurers (2003-04)  
Vice President (2005-06)  
President (2007-08)



**Rajiv Prasad**  
Treasurer (2009)



**R. Nandakishore**  
Treasurer (2007-08)



**Sunil Sikka**  
Vice President (2009)  
President (2010)  
Vice President (2014)  
President (2015)



**Rakesh Zutshi**  
Treasurer (2014)  
Vice President (2015)  
President (2016-17)



**Raju Bista**  
Treasurer (2015)  
Vice President (2016-17)  
President (2018-20)



**Nirupam Sahay**  
Vice President (2013)  
President (2014)



**Arun Gupta**  
Treasurer (2013)



**Sunil Vachani**  
Treasurer (2016)  
Treasurer (2017)





# ELCOMA HALL OF FAME



**Shekhar Bajaj**  
President (2004)



**Gagan Mehra**  
Vice President (2004)  
President (2005-06)



**H.R. Gupta**  
Treasurer (2005-06)



**Manoj Verma**  
Vice President (2007-08)  
President (2009)  
Vice President (2012)  
President (2013)



**Rajeev Chopra**  
Vice President (2010)  
President (2011)



**C.G.S. Mani**  
Treasurer (2010)  
Vice President (2011)  
President (2012)



**Arvind Bansal**  
Treasurer (2011)



**Dilip Basole**  
Treasurer (2012)



**Sumit Padmakar Joshi**  
Vice President (2018-20)



**Avinder Singh**  
Treasurer (2018-20)



**Shyam Sujan**  
Secretary General, Elcoma  
2004 - till date

*We regret that since we do not have records prior to 2003, we are not able to cover all the office bearers since the inception of ELCOMA i.e. 1970 till 2002*

## THE INDUSTRY CONGRATULATES



ELCOMA, over which I am honoured to preside, is celebrating its Golden Jubilee on 29 June, 2020. 50 years is a major milestone for any association. Today we pay homage to the founding fathers and salute them for their vision. ELCOMA's founders wanted that the lighting products should be available to the consumers at the most affordable prices and their vision has been fulfilled by the industry. Our industry adopted all the technological changes in the last fifty years very quickly – from a simple incandescent bulb to the latest smart lighting solutions, we have been matching pace with the rest of the world. Together we get to celebrate such a remarkable day in the history of our industry and our nation. I would like to congratulate the entire lighting fraternity once again for the golden jubilee celebration.

Namaskar. Jai Hind.

**RAJU BISTA**  
MANAGING DIRECTOR, SURYA ROSHNI  
PRESIDENT, ELCOMA



**SHYAM SUJAN**  
SECRETARY GENERAL, ELCOMA

I feel emotional when I see that ELCOMA has completed 50 years of its existence in India. I have personally spent more than 15 years with ELCOMA and I have seen the industry growing admirably. All small, mini, medium and large manufacturers are ELCOMA members. I am proud to say that all ELCOMA members exist as one family. I must congratulate all the members on this event of Golden Jubilee celebration of ELCOMA.



**MR. SUNIL SIKKA**  
ADVISOR, ELCOMA  
PRESIDENT, ELCOMA (2010, 2012)

The idea of ELCOMA was started by some visionary Industrialists. 50 years ago, it was the time of 'License Raj' and in order to get through to the government you needed a representative body. These industrialists thought of constituting an association, collected like-minded people and ELCOMA came into existence. I think this farsightedness paid off to a great extent. ELCOMA has created a platform where the interests of multinational companies, listed companies, unlisted companies and owner driven companies are represented equally and fairly. ELCOMA has proved over the last fifty years that this body not only brings the industry together and facilitates relationship with the Government but at the same time also ensures 100% compliance by the industry. I think it's been a great innings by ELCOMA and we look forward to celebrate 100 years of its existence and beyond.



**SUMIT PADMAKAR JOSHI,**  
VICE-CHAIRMAN & MANAGING DIRECTOR, SIGNIFY  
INNOVATIONS INDIA LIMITED  
VICE PRESIDENT, ELCOMA (2018-2020)

When people talk about Lighting, India is considered among the few countries where the LED transformation happened very fast and CFL products are almost out of production. When the CFL technology was introduced, Indian Lighting Industry invested heavily to manufacture these products and help bring energy efficiency and power saving to the country. Now we are looking beyond lighting. We are now thinking about what more can we do with lighting, how do we go to 'connected'. New technologies like Li-Fi are being introduced where you can transfer data through light. As an industry we moved from Incandescent to CFL to LED and now the transformation is happening to connect all those LED products and make them far more efficient and intelligent at the same time. From popularizing CFL, to introducing LED, advocacy against cheap imported goods or breaking new frontiers on lighting – ELCOMA has been at the forefront of these efforts in India.



**AVINDER SINGH**  
MANAGING DIRECTOR & CEO,  
OSRAM LIGHTING INDIA PVT. LTD  
TREASURER, ELCOMA (2018-2020)

ELCOMA as an association has done a commendable job in transforming the way Lighting Industry has grown in India. From a basic association to today being a body that is leading the way for regulations being in place – such as right safety standards, right performance for Indian conditions, ELCOMA has done a wonderful service to the industry. Completing 50 years is no small achievement. To remain relevant in an ever-changing industry for over 50 years is saying a lot about the value of ELCOMA to our industry.

# ELCOMA ON ITS GOLDEN JUBILEE



When I look back, ELCOMA has played a fantastic role in terms of managing relationships with and between the government and the industry. ELCOMA was established with two clear objectives – the first was to take care of consumer's interests and second was to take care of manufacturers' interests. Initially, there was always a conflict about whether we should import or we should manufacture lighting products in India. The consensus within the Industry was to always give priority to Indian manufacturing. Our Hon. Prime Minister Sh. Narendra Modi has been talking about a pledge to 'Make in India'. But this is something which we been talking about for more than fifty years in the Indian Lighting Industry.

We have great camaraderie among ELCOMA members. Though we compete in the same market, we are able to leave all that behind us when we are together on the ELCOMA platform and take collective decisions as a unified industry. This has happened primarily due the efforts of ELCOMA.

**MR. SHEKHAR BAJAJ**  
**CHAIRMAN & MANAGING DIRECTOR, BAJAJ ELECTRICALS LTD**  
**PRESIDENT, ELCOMA (2014)**



It was a pleasant surprise for me that in the association where the members who had thousands of crores as turnover, picked me, who was from a SME, as President. It was during this period that we brought on board Mr Mamak and Mr Sujan into ELCOMA. Another thing that we introduced was the creation of sub-committees. There was a sub-committee for lamps, luminaires, components, etc. All these committees were

chaired by the GB (General Body) members. I am glad to see that these changes have had the desired effect and to a large extent been able to achieve the objectives that were set for ELCOMA.

**DR. AVINASH KULKARNI**  
**CHAIRMAN & MANAGING DIRECTOR, LITEX ELECTRICAL PVT. LTD**  
**PRESIDENT, ELCOMA (2010, 2012)**



I have always looked upon ELCOMA as family where we can share our views and we can get information about the latest technology and about what is happening in Lighting in India. I think all of us who have been associated with ELCOMA are privileged to have seen technology changing several times in these 50 years from incandescent to FTL to CFL and now

to LED which is further moving towards smart lighting. The journey with ELCOMA has been so inspiring and knowledgeable. I wish that we continue to be part of this fraternity and grow with it.

**PUNEET DHAWAN**  
**SR. VICE PRESIDENT & BUSINESS HEAD, LIGHTING BUSINESS**  
**ORIENT ELECTRIC**



Firstly I would like to congratulate ELCOMA on completion of 50 years of being part of the Lighting Industry. ELCOMA has truly been the light-house of the industry – from

working closely with the government and industry, policy making, defining regulations, ensuring that the right lighting standards are adopted, identifying areas of expansion for the industry and also being the platform for exhibiting Indian Lighting in India and abroad. ELCOMA is now providing larger platforms where we can have workshops and seminars to disseminate knowledge about the industry to all the key players in the government as well as the industry.

**GAUTAM MALKANI**  
**MANAGING DIRECTOR,**  
**FULHAM (INDIA) PVT. LTD**



Congratulations to ELCOMA on completing 50 years. ELCOMA has been the mouthpiece of the light industry for many years now. There are

many sub-committees in ELCOMA such as the Industry Working Group which talks about the industry's problems and helps us solve them. ELCOMA has played a very big role in bringing the Indian Lighting Industry to where it is today.

**KRISHAN SUJAN**  
**MANAGING DIRECTOR,**  
**LEDVANCE PRIVATE LIMITED**



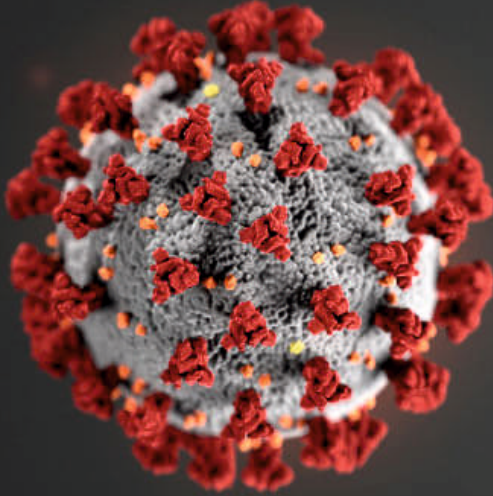
CFL started somewhere around the year 2000 and there were lot of cheap quality Chinese imports that were being sold

in India. It was ELCOMA's initiative that got anti-dumping duty introduced on CFL and because of that the CFL industry in India grew by leaps and bounds. The same thing is happening in LED also. ELCOMA has been trying to curb the cheap Chinese LED product imports and promote the domestic industry. I wish ELCOMA once again, all the best for completing 50 years.

**SANJAY GUPTA**  
**SENIOR VICE PRESIDENT, CONSUMER**  
**LIGHTING & SWITCHES,**  
**WIPRO CONSUMER CARE & LIGHTING**

# THE IMPACT OF COVID-19 ON INDIAN LIGHTING INDUSTRY

IllumiNation discusses the immediate and far reaching impact of the pandemic on the Indian Lighting Industry



## Do you think that the COVID-19 pandemic has changed the industry perspective?

Due to the recent lockdown, disruption in the supply chain has affected the availability of the imported components in our country. Our operating expense is in line with our projection and we do not see any change in that. However, many of our large B2B clients, are realigning their budgets and hence there could be a slight delay in taking decisions.

## How is the Indian Lighting industry going to look in the future?

As far as the future of the lighting industry is concerned; it looks vibrant but will take a few quarters for business to stabilise to the pre-COVID days. The industry will also expect the government to increase spending on infra projects resulting in higher demand for lighting products and solutions.

**Many industries are looking to hedge their bets against a situation similar to COVID-19 pandemic occurring in the future and are insulating their supply chains. Are you**

## looking at something similar?

In January 2020, we had already looked at various avenues to de-risk our business such as sourcing components locally and work with vendors across countries to ensure that our supply chain is not impacted. We have now fast-forwarded our search and expect to move towards a more risk-free operation. This COVID-19 has taught all of us to reimagine business all over again and we at Bajaj have aligned ourselves in order to remain ahead of the curve.

## What has been the impact of COVID-19 pandemic on your supply chain? How did you overcome this challenge?

There was a significant impact on the entire supply chain as we import close to 50% of our raw materials for LED products. However, with the reopening of the global supply chains, most of our suppliers have resumed operations. This global pandemic has made us rethink on our business strategy and we plan to increase sourcing components from

the domestic market. However, in the short to medium term, some critical components like LED Chips and other semiconductor components will continue to be imported. Other challenges like labour shortage and transportation continue to hamper our operations. We also look forward to the Government of India's support to electronic component manufacturing under Atmanirbhar or Vocal for Local program.

## What has been the impact of COVID-19 pandemic on product pricing? Do you see a long term impact on pricing?

The current disruption in the marketplace has led to an increase in prices as components and other accessories will be in short supply hence putting pressure on the pricing. However, we hope to see the situation stabilising and expect the demand to grow in the second half of this financial year.

**ANUJ PODDAR,  
EXECUTIVE DIRECTOR,  
BAJAJ ELECTRICALS LIMITED**



**Garnet**

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**The COVID-19 pandemic has ravaged industries and businesses around the world. What has been the impact of COVID-19 pandemic at your organization?**

Our organization being in the business of manufacturing LED drivers and light engines is deeply impacted by the disruption in the Supply Chain. Being dependent on a very large number of suppliers (both domestic and imports) is greatly affecting our ability to manufacture and deliver products in the market. On the demand side we are seeing a minimum reduction in demand by about 30% to 40% which will severely affect our profitability.

It is our endeavor to increase our share of exports to USA, Europe and Middle East to offset the reduction in demand for the domestic market. Streamlining supply chains by increasing local content will be the long-term change that we will need to implement.

**What do you think is the long term impact of COVID-19 on Indian Lighting industry?**

There will be an acceleration of lighting automation which will help in reducing touch points, reducing energy costs. UV lighting will see a sharp increase in demand for which the industry standards need to be established to

*“Each zone (North, West, South, East) should have at least 1 cluster for Lighting Manufacturers. This will improve operational efficiencies and help to a large extent to insulate supply chains in future”*

ensure correct products are received by end users.

**Many industries are looking to insulating their supply chains with a view to the future. What are your thoughts on this?**

This is a very critical issue and we must look at creating Lighting Clusters which include several component manufacturers, luminaire manufacturers, testing laboratories etc. Each zone (North, West, South, East) should have at least 1 cluster for Lighting Manufacturers. This will improve operational efficiencies and help to a large extent to insulate supply chains in future.

**What has been the impact of COVID-19 pandemic on product / components pricing? When will things return to normal?**

There will be an increase in manufacturing overheads and labour cost as compliance requirements will increase. The weakening of the Indian Rupee against the USD is another cause of concern which is driving the pricing up.

It is expected that requirements for outdoor lighting will see a faster recovery as compared to office lighting which would be the last to recover. We expect disturbance to continue for at least one year more before things return to normal.

**What should the Government be doing to support the Industry?**

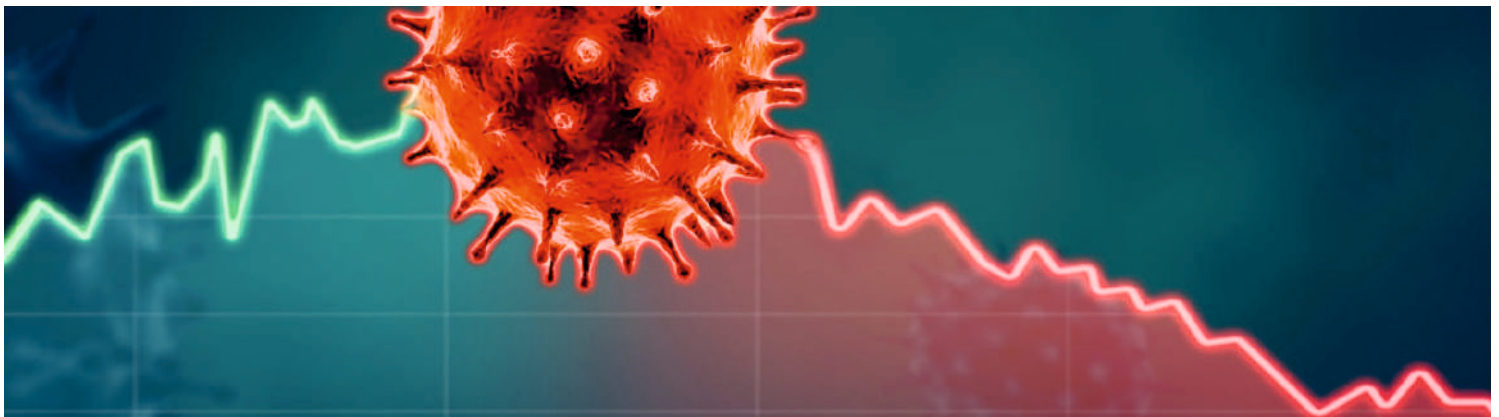
Unfortunately there are very limited opportunities in the existing stimulus package announced by the Government from which we

can draw benefit. The Government of India needs to address the Inverted Duty Structure on priority and get this resolved as huge amounts of working capital are getting blocked as a result of this. Similar to imports of finished goods like luminaires, even finished components such as LED drivers should have higher duty tariffs. Concessional duties of 5% should be abolished for LED Drivers. In order to promote Indian manufacturing finished components such as LED Drivers should be mandated to be manufactured in India only as far as possible. Core electronics industry which requires huge funding and long gestation periods should be established in India through Public-Private participation.

The Prime Minister's call for “Aatmaribhar Bharat” calls for India to be self-reliant in all verticals but due to non-availability of core electronics, the Lighting Industry in India is forced to depend on imports for components such as LEDs, ICs, Diodes, Capacitors, Mosfets etc.

There is a huge potential for exports from India to other countries. The government needs to gear up basic infrastructure such as roads, ports, industrial manufacturing hubs which meet international standards. Even smaller countries such as Vietnam, Thailand and Malaysia have better infrastructure than India. It is high time we improve our infrastructure standards if we wish to become a serious player in the Global Market.

**GAUTAM MALKANI,  
MANAGING DIRECTOR,  
FULHAM (INDIA) PVT. LTD**



**The COVID-19 pandemic has ravaged industries and businesses around the world. What has been the impact of COVID-19 pandemic on the components supply business?**

At Componix, we primarily support lighting manufacturers and most of the principals we represent are Chinese. Our industry has been impacted quite a lot in the first two quarters of this calendar year.

In Q1-CY20 our supplies were impacted due to Chinese New Year and then by the lockdown of the entire Chinese economy which threw the whole world's into an economic freeze. Our customers in India needed materials, but due to factories being closed in China, we were unable to supply any

*“Many customers are definitely exploring local suppliers for their component needs and are also looking for non-Chinese brands to fulfil their needs”*

components. In Q2 the pandemic hit India by which time the Chinese factories started to open. Q2 was a reverse of Q1. Supply was available in China but there were no takers in India since a strict lockdown was in place and all import shipments were on hold.

At present the Indian Rupee has fallen over 5% since the pandemic and freight costs are five times of what they were in the beginning of the year. To add to this, due to the large backlog of material piling up at ports, custom clearance is taking very long and all material deliveries are delayed significantly.

**Do you think that the COVID-19 pandemic has changed the industry perspective? How is the Indian Lighting industry going to look in the future?**

Many customers are definitely exploring local suppliers for their component needs and are also looking for non-Chinese brands to fulfil their needs. But having said that, there is not much of component manufacturing in India so local sourcing may be limited to PC based lamp and luminaire housing, PCBs and inductors, etc

**What has been the impact of COVID-19 on your product / components pricing? Do you see a long-term impact on pricing? By when do you believe the sales in India will return to normal levels?**

Yes, of course we have had to increase prices by 7-10% due to weaker Rupee and higher cost of freight, but we are seeking support from our principals to revise prices so that we can support our customers also in these tough times.

As the lockdown is eased and markets open, situation is slowly improving. We believe that the retail markets will start moving at a more rapid rate and possibly by the September-October timeframe, markets should be in full flow during the festive season and Diwali festival.

**NISHIKANT DWIVEDI,  
MARKETING MANAGER,  
COMPONIX INDIA**

**What has been the impact of COVID-19 pandemic at MLS, which is one of the largest manufacturers of LED packages in the world?**

COVID-19 has impacted all the industries around the world and MLS is no exception. MLS re-started its factories in late March and by end of May 2020, were at close to full capacity. But since then the pandemic has been spreading at an alarming rate across the world and most economies are either locked-down or very slowly returning back to normal. As a result of this low demand, MLS has had to reduce its capacity and currently its operating

*“Indian industry has to focus on being innovative and forward looking and not search for design ideas from others”*

at about 65-70% of its full capacity. We are using this time for new product development and innovations.

**How is the Indian Lighting industry going to look in the future?**

The Indian lighting industry perspective is changing. More and more products are being designed in-house rather than just copying existing Chinese products. Indian industry has to focus on being innovative and forward looking and not search for design ideas from others.

Its good to see that many manufacturers are realigning their supply chains by focusing on local manufacturing and sourcing and MLS fully supports that. MLS is willing to invest and can set up base in India if the conditions are conducive for large scale manufacturing.

**Do you see a long-term impact on pricing?**

As of now there is no impact on the pricing of MLS products in India due to COVID-19. It is possible that prices may reduce in the immediate future depending on the demand and how fast the Indian economy rebounds. If demand falls significantly, then the price is expected to erode since everyone will be fighting for the same pie in a competitive components market.

We expect the economic recovery to gradually pick up pace starting mid-August but a full recovery will probably take place only by the end of CY2020.

**SHOBHIT BHASIN,  
VICE PRESIDENT, MLS INDIA**

# ULTRAVIOLET RADIATION PRIMER

## A brief overview of Ultraviolet Radiation

**U**ltraviolet (UV) is a form of electromagnetic radiation with wavelength from 10 nm to 400 nm, shorter than that of visible light but longer than X-rays. UV radiation is present in sunlight, and constitutes about 10% of the total electromagnetic radiation output from the Sun. It is also produced by electric arcs and specialized lights, such as mercury-vapor lamps, tanning lamps, and black lights. The lower wavelength limit of human vision is conventionally taken as 400 nm, so ultraviolet rays are invisible to humans, although some

people can perceive light at slightly shorter wavelengths than this.

Short-wave ultraviolet light damages DNA and sterilizes surfaces with which it comes into contact. For humans, suntan and sunburn are familiar effects of exposure of the skin to UV light, along with an increased risk of skin cancer. The amount of UV light produced by the Sun means that the Earth would not be able to sustain life on dry land if most of that light were not filtered out by the atmosphere.

More energetic, shorter-wavelength "extreme" UV below 121 nm ionizes air so strongly that it is absorbed before it reaches the ground. However, ultraviolet light (specifically, UVB) is also responsible for the formation of vitamin D in most land vertebrates, including humans. The UV spectrum thus has effects both beneficial and harmful to life.

### ARTIFICIAL SOURCES OF ULTRAVIOLET

#### Black lights

A black light lamp emits long-wave UVA radiation and little visible light. Fluorescent black light lamps work similarly to other fluorescent lamps but use a phosphor on the inner tube surface which emits UVA radiation instead of visible light. Black lights are used in applications in which extraneous visible light must be minimized, while UVA/UVB emitting bulbs are also sold for other special purposes, such as tanning lamps and reptile-keeping. Mercury-vapor black lights in ratings up to 1 kW with UV-emitting phosphor are used for theatrical and concert displays.

#### Short-wave ultraviolet lamps

Shortwave UV lamps are made using a fluorescent lamp tube with no phosphor coating, composed of fused quartz or vycor, since ordinary glass absorbs UVC. These lamps emit ultraviolet light with two peaks in the UVC band at 253.7 nm and 185 nm due to the mercury within the lamp, as well as some visible light. 85% to 90% of the UV produced

by these lamps is at 253.7 nm, whereas only 5–10% is at 185 nm. These low-pressure lamps have two or three times the UVC power of a regular FTL and have a typical efficiency of approximately 30–40%. These "germicidal" lamps are used extensively for disinfection of surfaces in laboratories and food-processing industries, and for disinfecting water supplies.

#### Gas-discharge lamps

Specialized UV gas-discharge lamps containing different gases produce UV radiation at particular spectral lines for scientific purposes. Argon and deuterium arc lamps are often used as the emitting sources in UV spectroscopy equipment for chemical analysis. Other UV sources with more continuous emission spectra include xenon arc lamps (commonly used as sunlight simulators), deuterium arc lamps, mercury-xenon arc lamps and metal-halide arc lamps.

#### Ultraviolet LEDs

Light-emitting diodes (LEDs) can be manufactured to emit radiation in the ultraviolet range. In 2019, UVA LEDs of 365 nm and longer wavelength were available with efficiencies of 50 percent at 1000 mW output. Such LEDs are increasingly used for UV curing applications and are already successful in digital print applications and inert UV curing environments. UVC LEDs are developing rapidly, but may require testing to verify effective disinfection.

#### Ultraviolet lasers

Gas lasers, laser diodes and solid-state lasers can be manufactured to emit ultraviolet rays, and lasers are available which cover the entire UV range. The strongest ultraviolet lines are at 337.1 nm and 357.6 nm, wavelength. Ultraviolet lasers have applications in industry (laser engraving), medicine (dermatology, and keratectomy), chemistry (MALDI), free air secure communications, computing (optical storage) and manufacture of integrated circuits.

"Ultraviolet" means "beyond violet" (from Latin ultra, "beyond"), violet being the color of the highest frequencies of visible light. Ultraviolet has a higher frequency (and thus a shorter wavelength) than violet light.



## UV RADIATION SPECTRUM

The electromagnetic spectrum of ultraviolet radiation (UVR), defined most broadly as 10–400 nanometers, can be subdivided into a number of ranges recommended by the ISO standard ISO-21348

NAME	ABBREVIATION	WAVELENGTH (NM)	DETAIL
Ultraviolet A	UVA	400-315	Long-wave, soft UV. Also called black light which is not absorbed by the ozone layer
Ultraviolet B	UVB	315-280	Medium-wave, intermediate UV. Mostly absorbed by the ozone layer
Ultraviolet C	UVC	280-100	Short-wave, hard UV. Germicidal. Completely absorbed by the ozone layer and atmosphere
Near ultraviolet	NUV	400-300	
Middle ultraviolet	MUV	300-200	
Far ultraviolet	FUV	200-122	
Hydrogen Lyman-alpha	H Lyman- $\alpha$	122-121	Spectral line at 121.6 nm. Ionizing radiation at shorter wavelengths
Vacuum ultraviolet	VUV	200-10	Strongly absorbed by atmospheric oxygen. 150–200 nm wavelengths can propagate through nitrogen
Extreme ultraviolet	EUV	121-10	Entirely ionizing radiation. Completely absorbed by atmosphere

## USES OF ULTRAVIOLET

Because of its ability to cause chemical reactions and excite fluorescence in materials, ultraviolet radiation has a number of applications.

UV WAVELENGTH BAND	APPLICATION/USES
13.5 nm	Extreme ultraviolet lithography
30-200 nm	Photoionization, ultraviolet photoelectron spectroscopy, standard integrated circuit manufacture by photolithography
230-365 nm	UV-ID, label tracking, barcodes
230-400 nm	Optical sensors, various instrumentation
240-280 nm	Disinfection, decontamination of surfaces and water (DNA absorption has a peak at 260 nm), germicidal lamps
200-400 nm	Forensic analysis, drug detection
270-360 nm	Protein analysis, DNA sequencing, drug discovery
280-400 nm	Medical imaging of cells
300-320 nm	Light therapy in medicine
300-365 nm	Curing of polymers and printer inks
350-370 nm	Bug zappers (flies are most attracted to light at 365 nm)

AUTHOR: ILLUMINATION EDITORIAL BOARD

# UV-C GERMICIDAL IRRADIATION

A look at the germicidal properties of UV-C and potential applications

UV-C is commonly associated with radiation within the 100-280 nm wavelength range. Below a wavelength of 200 nm (commonly referred to as vacuum UV), UV-C is strongly absorbed by atmospheric oxygen and produces ozone. Lamps and/or systems designed to provide UV-C radiation above 200 nm are utilized for surface, air and water disinfection.

## Disinfection Properties Of UV-C

UV-C radiation has been used for disinfection purposes for over 100 years and can neutralize micro-organisms such as bacteria, moulds and yeasts, as well as viruses.

There are no known viruses resistant to UV-C radiation. Disinfectant UV-C radiation effectively damages RNA and DNA of the virus and renders it non-infectious. The ability of UV-C radiation is a function of UV-C irradiance (UV-C power/unit area) and the amount of time the virus is exposed to radiation. Germicidal action is maximised at 265 nm. Low pressure lamps have their main emission at 254 nm where the action on DNA is 85% of the peak value.

## UV-C and COVID-19

The COVID-19 infection is caused by a new coronavirus, named SARS-CoV-2. Coronaviruses (CoVs) comprise four groups of enveloped, single-stranded RNA viruses coated in a lipid bilayer, studded with proteins that protrude like spikes of a crown (hence the name corona). Coronaviruses are a common cause of respiratory infections, including 20% of cases of the common cold. Other coronaviruses include the SARS-CoV outbreak of 2002–04 and the MERS-CoV outbreak of 2012–13.

The SARS-CoV-2 is closely related to SARS-CoV, and thus estimates on UV-C effectiveness against SARS-CoV-2 may be made from SARS-CoV studies. Studies on the efficacy of UV-C with the SARS-CoV-2 are in process.

## UV-C APPLICATIONS

UV-C irradiance can inactivate viruses. Each type of organism requires a specific dose for inactivation. UV-C products are used for air, water and surface disinfection in industrial, commercial, medical, public and residential environments.

### Air disinfection

Trapped or recirculated indoor air contains bacteria, moulds and viruses which can infect residents and cause illnesses. Such contaminants and their associated airborne infections can be considerably reduced by applying UV-C germicidal irradiation in open controlled access locations, partially open upper-air disinfection luminaires or in closed heating, ventilation, air conditioning and cooling (HVAC) systems.

Air disinfection in **open controlled access locations** is used where the interior is unoccupied or where it is possible for the occupants to take protective measures against the UV-C irradiance.

**Partially open upper-air disinfection luminaires** are used in occupied interiors without the occupants wearing protective clothing. The UV-C sources (lamps) should be mounted in suitable reflectors and aimed to emit no radiation below the horizontal. These reflectors should be mounted more than 2.10m above the floor, thereby rendering the lower air entirely free of any direct UV light and protecting individuals from exposure risks. Air above the 2.10m level is subject to direct UV-C light and therefore maintains a low germ level.

In **closed HVAC systems** the UV-C source (lamps) can be completely enclosed so there is no limit to the maximum permitted radiation dose, since humans are not exposed to the UV-C irradiance.

### Water disinfection

UV-C irradiance provides water disinfection without the addition of chemicals that may produce harmful by-products and add

unpleasant taste to water. UV-C water disinfection systems are mainly closed systems where direct contact between the UV-C source (lamp) and the water is prevented by a UV-C transparent quartz or PTFE (Polytetrafluoroethylene) sleeve.

### Surface disinfection

UV-C surface (or air) disinfection applications, can be open controlled access locations, partially open upper-air disinfection luminaires or closed cabinets/chambers. UV-C surface disinfection is only successful if the entire surface is exposed to UV-C irradiance. Bacteria, moulds and viruses in indentations in a rough surface are not likely to be deactivated by the direct UV-C irradiance.

In practice, solid surfaces, granular material and packaging (whether plastic, glass, metal, cardboard, foil, etc.) are purified or maintained by means of intensive, direct irradiation. Rough surfaces, on the other hand, can be better treated with short (< 240 nm) UV-C wavelengths that produce ozone, since the toxic ozone can penetrate the indentations and tissue of the material and deactivate the bacteria, moulds and viruses. The toxic ozone can only be used in closed cabinets/chambers.

Surface disinfection is used in industrial and public environments. Closed cabinets and chambers may also be used for surface disinfection in residential environments as they are designed with safety interlocks to prevent UV-C exposure.

## UV-C DISINFECTION LIGHT SOURCES

The light source is the core of any UV-C disinfection device. The light source determines the mechanism and effectiveness of microorganism inactivation.

### Low pressure mercury lamps

Because of their high efficiency, low cost and technical maturity, low-pressure mercury lamps (LPMs) are widely adopted UV-C sources employed in disinfection and sterilization. LPMs are filled with a rare gas,

typically argon, with traces of mercury vapour. At room temperature, mercury has the highest vapour pressure of any of the elements suitable for producing radiation. The typical spectrum of LPMs consists of two mercury resonance lines in UV, among which the 254 nm radiant efficiency can reach more than 50% for normal power products while around 30% for high loaded lamps above 300 W. Another strong resonance line at 185 nm, the efficiency of which occurs around one-fifth of 254 nm, can also be applied for disinfection but may cause ozone production due to its high photon energy. Hence there are two types of UV-C LPMs: 254 nm UV-C lamps and 185 nm UV-C lamps which emit both lines. The geometry of germicidal UV-C LPMs is similar to that of fluorescent lamps for general lighting.

#### Medium-pressure lamps and high-pressure mercury lamps

Medium-pressure lamps and high-pressure mercury lamps, which can emit a continuous spectral base overlapped with many atomic lines of mercury and argon, are generally used in photochemical reactions. The 185 and 254 nm mercury resonance lines are mostly absorbed in the discharge so that the radiative

excited transitions occur between higher energy levels. This results in strong lines such as 313, 365, 405, 436, 546, 578 nm. Because of the high-power density of 0.5-20 kW applied to the 0.2-2 m electrodes gap, the 250-280 nm UV-C radiation in medium-pressure mercury lamps (MPMs) is strong enough for germicidal applications. However their high heat may require additional cooling systems, which increases equipment cost and security risk. For these reasons MPMs have been used in large flow water sterilization systems.

#### Pulsed-driven xenon lamps

Pulsed-driven xenon lamps are high intensity discharge sources, whose transient power can reach more than 50 kW, leading to very high intensity in single pulse. The full spectrum of xenon lamps covers ultraviolet to near infrared light. Such light has a strong continuous base with atomic lines around 275 nm, which can be applied for germicidal use.

#### Excimer lamps

Excimer sources are referred to variously as excimer lamps, exciplex lamps, or more generally excilamps and produce a relatively narrow spectrum of ultraviolet and vacuum ultraviolet radiation from excimer molecules.

Recently, KrCl excilamps that can provide 222 nm narrow-band radiation have gained attention as a consequence of some COVID-19 reports stating that this far-UV-C radiation can efficiently inactivate bacteria without harm to exposed mammalian skin and eyes. This suggests potential of excilamps in open luminaires for air and surface disinfection. However, the COVID-19 inactivation effect as well as the physiological innocuousness of 222 nm UV-C are still contentious issues.

#### UV-LEDs

As solid-state light sources, UV-LEDs show promise in various UV special applications and have been a research focus in recent years. Major breakthroughs have occurred recently with UV-ALED technology above 365 nm, leading to mass production. However because of the limited germicidal properties of UV-A radiation, they are recommended for UV-A/TiO<sub>2</sub> photo-catalysis rather than solely employed in most disinfection or sterilization applications. Deep UV (DUV) LEDs including UV-B (280-315 nm) LEDs and UV-C (<280 nm) LEDs, are highly effective on microorganism inactivation. But there are few practical applications due to the low efficiency and power and high cost.

### PERFORMANCE OF VARIOUS UV LIGHT SOURCES

UV LIGHT SOURCES	SPECTRUM	RADIANT EFFICIENCY			LUMINAIRE EFFICIENCY	POWER EFFICIENCY	EFFICIENCY			LAMP POWER
		UV-C	UVB	UVA			UV-C	UVB	UVA	
LPM	Line, 254 nm strongest	55.30%	2.80%	1.90%	0.6	0.8	29.90%	1.50%	1.00%	4-800
HPM	Line with continuous 365 nm strongest	3.40%	3.20%	5.20%	0.6	0.7	1.70%	1.60%	2.70%	500-20000
PL XE LAMP	Continuous	0.50%	0.50%	1.50%	0.6	0.7	0.20%	0.30%	0.70%	10~50000
KRCI EXCILAMP	222 nm narrow band FWHM 2~3 nm	4~10%	-	-	0.6	0.7	1.6~4%	-	-	20~1000
UVA LED	Band, FWHM~10 nm	-	-	30~40%	0.9	0.9	-	-	24%~32%	1-36 (chip)
DUV LED	Band, FWHM~10 nm	<3%	<3%	-	0.9	0.9	<2.4%	<2.4%	-	0.1~3 (chip)

AUTHOR: ILLUMINATION EDITORIAL BOARD

This article has been compiled from GLA's draft document UV-C Germicidal Irradiation: SOURCES, APPLICATIONS AND PRODUCTS

# DELHI AIRPORT USING ULTRAVIOLET DISINFECTION TECHNOLOGY TO FIGHT CORONAVIRUS

Reported in IndiaTV news

The Delhi airport is using mobile towers, handheld torch and baggage tunnels that deploy ultraviolet (UV) rays to disinfect surfaces in order to combat coronavirus. The mobile towers are placed in properly cordoned areas of a terminal and the UV lamps inside them are used for disinfection.

Once an area has been disinfected, the UV power is switched off and the towers are manually re-located to other areas for a similar process. Handheld disinfection torch is

also being used to disinfect desktop, laptops and other devices.

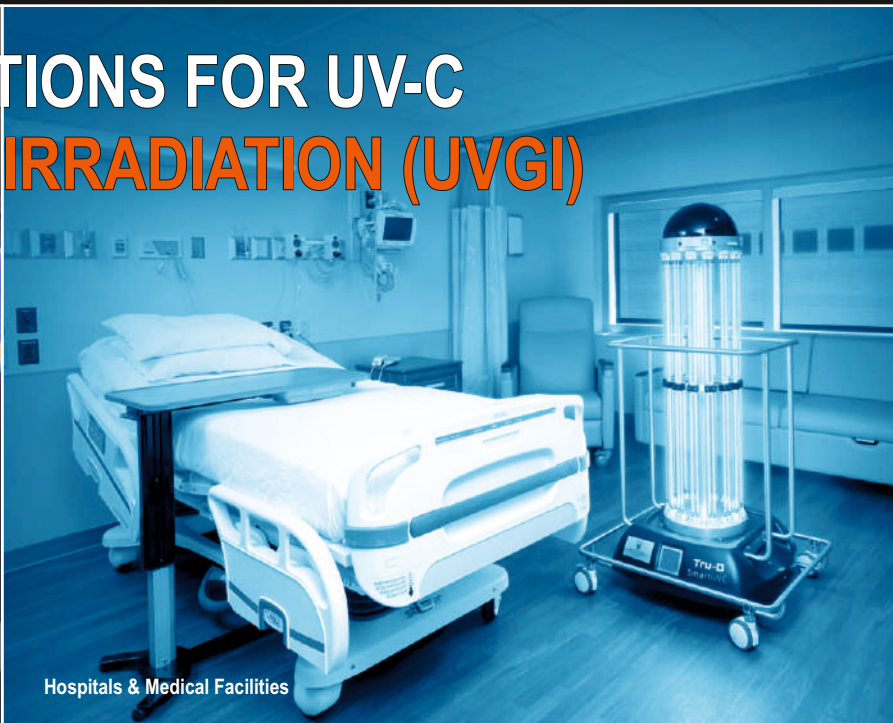
DIAL (Delhi International Airport Limited) has also installed UV tunnels at Terminal 3 of the Delhi airport to disinfect passengers' luggage. A live CCTV feed of UV scanning process mounted at baggage reclaim hall allows the passengers to see the disinfection process, in which high-intensity UV lamps are being used for on-line disinfection of their bags.

ARTICLE PUBLISHED IN THE HINDU, 11 MAY 2020



## APPLICATIONS FOR UV-C GERMICIDAL IRRADIATION (UVGI)

Making Air Travel Safer by Using UVGI Robots to Disinfect Planes



Hospitals & Medical Facilities



Disinfecting Public Transport using UVGI

UV Lamps in Personal Spaces for Disinfection



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# ELCOMA UV TASK FORCE

**E**LCOMA, as the apex body of lighting Association in India, is concerned at the proliferation of UV-C disinfecting devices with dubious safety features and inadequate safety instructions.

ELCOMA realizes that there is an urgent need for comprehensive technical safety standards for UV-C devices. Standards are expected to be developed by the International Electrotechnical Commission (IEC), Bureau of Indian Standards (BIS), Underwriters Laboratories (UL) and other standards development Organizations (SDOs), but it will take many months before they are published. Pending development and publication of such standards and in line with the position paper developed recently by GLA, ELCOMA has taken the lead in India and formed a Task Force to develop a position paper which will define both safety and performance test requirements for such devices. The paper will

also include basic concepts of UV-C radiations, applications, types of devices covered so as to have an overall perspective of this technology and products, in order to address the following:

- Consumer awareness of the concept of UV-C and its potential health hazards
- Safety and performance tests requirements which will ensure elimination of human health hazards and also measure the benefits in terms of disinfection capabilities
- Influence certification bodies to adopt these guidelines and bring these products under a regulatory framework
- Implement regulation and enforce actions for non-compliant products

The first meeting of The Task Force was held on 23rd June 2020 and the target date to complete the paper was decided to be end of

July 2020. The task force team comprises members from industry like Signify, Crompton, Surya, Ledvance, Osram, Bajaj, Havells, Halonix, Luminous India, UL, C&S Electric, Arklite, Orient, Century LED and Fulham. Chairman of the task force is Dr. Avinash Kulkarni and the members' Secretary is Amal Sengupta of ELCOMA. The other team members include Dr. H. C. Kandpal, former Head of Testing and Standardization of National Physical Laboratory, Mr. V.K. Gupta of Kwalitiy India and Mr. Vineet Rahtogi of Binay Electronics.

The team has already conducted 3 successful meetings and the first draft of the document has already been prepared. It is expected that the paper should be released by end of July 2020.

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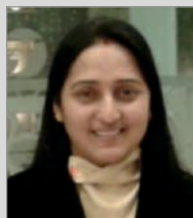
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# HUMAN CENTRIC LIGHTING : LIGHTING FOR THE FUTURE

A look at Human Centric Lighting and how it can impact lighting of the future

**A**rtificial light has revolutionized our lives. We can work anywhere at any time making us more productive. But it does not necessarily make us healthier. For a healthy, efficient rhythm of life, we need the natural changes in daylight. Working indoors in poor light makes us tired, depressed and listless.

Daylight determines the quality of our lives.

In our modern society, we are moving further and further away from our natural environment and spending more time in offices with little daylight, dark meeting rooms and artificial light until late at night. Daylight is one of the most important sources of energy for our biological rhythm. A lack of daylight can cause serious disruption to our day/ night rhythm (our "inner clock"), and massive degradation in our performance and overall well-being.

A circadian rhythm is a natural, internal process that regulates the sleep-wake cycle and repeats roughly every 24 hours. It can refer to any biological process that displays an endogenous, entrainable oscillation of about 24 hours. These 24-hour rhythms are driven by a circadian clock, and they have been widely observed in plants, animals, fungi, and cyanobacteria.

The term circadian comes from the Latin *circa*, meaning "around" (or "approximately"), and *diēm*, meaning "day". The formal study of biological temporal rhythms, such as daily, tidal, weekly, seasonal, and annual rhythms,

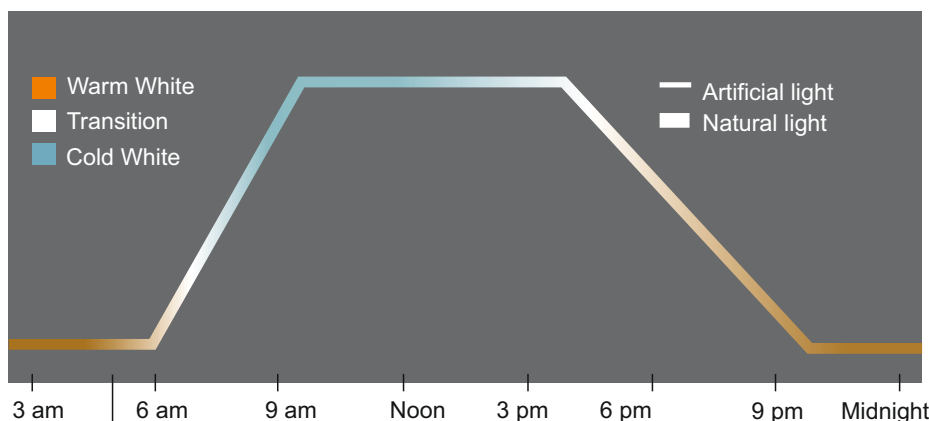


Fig : HCL is based on the natural changes in daylight. This has a positive effect on people.

is called chronobiology.

Circadian rhythms are linked to your body's internal clock and your sleep/wake cycle. Circadian rhythms are important in determining your natural sleeping and feeding patterns. Brain wave activity, hormone production, cell regeneration, and other important biological processes are determined by this cycle. Disruptions impacting our internal clocks have been shown to give rise to a multitude of issues, not limited to sleep disorders, cardiovascular disease, certain types of cancer, and affective disorders.

When eyes receive light from the sun, the pineal gland's production of melatonin is inhibited and the hormones produced keep the human awake. When the eyes do not receive light, melatonin is produced in the pineal gland and the human becomes tired.

If we receive too little light during the day, our melatonin level falls too low. As a result, we do

not sleep well at night, and we are sluggish, tired and listless during the day

## WHAT CAN HUMAN CENTRIC LIGHTING DO?

Lighting solutions for modern work environments must be designed to promote creative thinking and high levels of concentration at desks, on computers and in factories. Human centric lighting places the focus on people and their need for natural light.

With the right light at the right time human centric lighting (HCL) creates a working environment that simulates the changes in natural daylight with its visual, biological and emotional effects. To achieve this, the luminaires are controlled by an intelligent control system with appropriate light profiles.

Through color temperatures and illuminance levels, human centric lighting (HCL) can simulate the course of natural daylight in such a way that it provides positive support for the human circadian rhythm (our "inner clock"). A neutral or cold white light color, for example, can energize in the morning. Warm white light is relaxing and ideal for the evening. HCL supports health, well-being and performance.

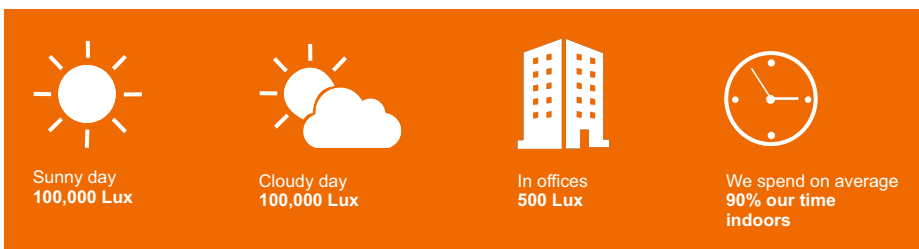


Fig : We underestimate the problem caused by lack of light

AUTHOR: ILLUMINATION EDITORIAL BOARD

# ELCOMA PILOT PROGRAM FOR SAFE DISPOSAL OF CFL

Pictures of Pilot Program organized in Delhi, Mumbai and Goa







# LEDVANCE FIRST COMPANY TO RECEIVE NEW VDE QUALITY CERTIFICATE FOR HUMAN CENTRIC LIGHTING (HCL)

LEDVANCE received the HCL certificate with the best possible quality award (3/3 stars) for its new and advanced BIOLUX HCL system from the independent VDE Testing and Certification Institute which recently certified that the company has qualitatively fulfilled all existing requirements, norms and standards for an HCL system. The system positively supports the human biological day-night-rhythm, increases well-being and performance during the day and improves the quality of sleep at night.

Independent test engineers carry out product, quality and safety tests on more than 100,000 devices per year before the VDE Institute awards the test mark. The VDE Institute has now developed a new standardised catalogue of test-criteria to evaluate HCL systems with regard to quality, safety, performance and usability. Compliance with these criteria is confirmed by a three-stage certificate. The BIOLUX HCL system from LEDVANCE achieved outstanding results in the tests and is the first HCL system ever to receive the new

VDE HCL certificate with the best possible award of 3/3 stars. The evaluation was based on various criteria regarding light quality, correct simulation of the course of daylight, energy and cost efficiency, safety, ease of installation and commissioning, usability and compliance with national, EU and global norms and standards.

The LEDVANCE BIOLUX HCL system consists of wirelessly connected components. The intelligent BIOLUX control unit ensures - as the heart of the system - that the corresponding BIOLUX LED luminaires simulate the natural course of daylight in terms of light colour and intensity. Unique to the BIOLUX HCL system is the possibility of manually adjusting light to different situations using five predefined light modes. While the NATURAL mode simulates the natural course of daylight, the BOOST and FOCUS modes support concentration and productivity. RELAX provides relaxing light during breaks and with CREATE brainstorming sessions are encouraged. The built-in safety mechanism has been particularly positively evaluated by

the VDE Institute: The five different light modes always follow the curve of natural daylight and thus ensure that the effects on the biorhythm are positive at all times. This makes the BIOLUX HCL system particularly suitable for offices, meeting rooms, hospitals, doctors' surgeries as well as elder care and nursing homes.

After connection to the power grid, the LEDVANCE BIOLUX HCL system can be installed and commissioned in five to ten minutes in an uncomplicated, fast and wireless manner using a smartphone app. The system automatically determines the time of sun rise and sunset based on the geographical location and autonomously configures all settings based on the course of daylight. As the system works independently and configures itself, no complicated programming or integration into existing lighting management systems is necessary. This keeps costs low and contributes to a particularly economical use. A total of up to 20 luminaires can communicate with the intelligent control unit, which can be added to the system simply by scanning the QR code. The complete communication of control unit and luminaires is securely encrypted and no user data is transferred. The user can set the five lighting modes in no time at all via the control unit.

In addition to the VDE certification, LEDVANCE was recently awarded the German Innovation Award in the category "Excellence in Business to Business – Lighting Solutions" for its BIOLUX HCL system. For the outstanding design quality of the BIOLUX HCL control unit, LEDVANCE previously also received the Red Dot Award 2020 in the category "Product Design".



**AUTHOR: LEDVANCE PRIVATE LIMITED**

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

# SIGNIFY LAUNCHES TWIN GLOW BATTENS



Of late, we all have realised the benefits of 'Working from Home'. At the same time 'Relaxing from Home' has also become a way of life. That is why the all new Philips TwinGlow LED Batten is designed to adapt to your mode – be it Work Mode or Relax Mode.

The Work Mode (20W Cool White – Downlight 6500K) of TwinGlow is super bright white downlight spread across the room to help you focus on your work. The downlight is tilted at an accurate angle downwards across the room for better light spread.

With the flick of a switch, TwinGlow goes into Relax Mode (20W Golden Yellow – Uplight 3000K) and transforms your room with a comfortable cosy golden yellow ambient uplight that is directed towards the ceiling – so that you do not see the light source directly and hence avoid eye strain. The uplight bounces off the ceiling and spreads evenly across the entire room. This is perfect for watching TV, unwinding with your spouse etc.

# BAJAJ ELECTRICALS LAUNCHES SUNSHINE CRI PLUS RANGE (CRI>90) IN B2C SEGMENT



The new range of Sunshine CRI Plus LED Lamps, Battens and Down Lights offers a unique specification of 90+ CRI, first-of-its-kind in B2C segment. The Sunshine CRI Plus LED range comes with enhanced CRI which makes objects appear just as they would look under natural light. With the launch of this range, Bajaj Electricals endeavours to add another feather to its

innovation space and improve customer experience through smart technology and intuitive designs.

The Sunshine CRI Plus range consists of Sunshine CRI Plus LED Lamp 9W/ 12W which is a BEE 3-Star rated energy-efficient lamp available in CDL (6500K) and lumen efficacy of 90 Lm/W with 3.5 kV voltage surge protection. The Sunshine CRI Plus LED Batten 20W offers lumen efficacy of 100 Lm/W in CDL variant, 2.5 kV voltage surge protection. The Sunshine CRI Plus LED COB Down Light 12W offers lumen efficacy of 100 Lm/W with 2.5 kV voltage surge protection and power factor > 0.9. It is made of a powder-coated die-cast aluminium housing with swivel operation for directional lighting and specially designed heat sink for enhanced life. It is available in 5000K for applications in home lighting.

# HPL ELECTRIC LAUNCHES KASPER INVERTER LAMP



**H**PL Electric & Power Ltd. has further diversified their product basket in the consumer lighting segment by adding new range of lighting products with state-of-the-art design & technology, incorporating best industry features and made in compliance with Indian and International standards.

The latest product from HPL is called Kasper (The Inverter Lamp) which they claim is one of the most efficient products which comes equipped with fast charging and is available in 9W primarily catering to the retail consumers.

The lamp provides high power backup of upto 4 hours and contains a BIS approved inbuilt Li-ion rechargeable battery. It has protection against over voltage, over charging and has surge protection of 2.5KV.

## MAGIK PRISM PLUS LED BATTENS



**L**ight plays a very important role in increasing our productivity. With the outbreak of the COVID-19 pandemic and increase in work from home, rooms in houses are no more just the place to relax after returning from work but have now become an area where all the productive works are also being done which requires adequate light to keep a person active.

Magik Prism Plus LED Battens are the best lighting solution for such areas and is ideal solution for lighting productive areas/activity

rooms which require more brightness. Prism Plus LED Batten is a high quality batten which is made up of high quality LEDs with robust driver and aluminium body which delivers high brightness and longer life.

These battens are available in 40W (4 ft) and 20W (2 ft). The 40W batten is specially designed for medium and large areas which require high illumination and the shorter batten is ideal for high activity rooms like kids room, corridors etc and provides same lumen output

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**FLICKER IN LED  
LIGHTS IS NOT  
VISIBLE.  
BUT IT AFFECTS  
EYE HEALTH.**



**How to check  
for flicker?**

**1**

Open your smartphone camera  
in slow-motion video mode.

**2**

Point the camera towards  
the lights & check for flicker.



**eyeLuv**  
Flicker-Control Technology



RECOMMENDED BY  
INDIAN MEDICAL ACADEMY  
FOR PREVENTIVE HEALTH



**Low flicker, Toh no fikar**



LED  
LIGHTS

It's a Bright Idea!



IN 1 LAMP

RED | BLUE | MAGENTA | NIGHT MODE

# LIGHT FOR EVERY MOOD

OTHER VARIANTS



CW | WW | NW | NIGHT MODE



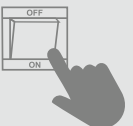
CW | BLUE | SKY BLUE | NIGHT MODE

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For Colorful Ambiance

Make every space shine with the glow that's not just beautiful but can be adjusted to your mood.

Just ON/OFF the switch to select the colour of the light as per your mood.



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Surya Roshni meticulously ensures  
the best quality lighting products for interior & exterior applications.

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