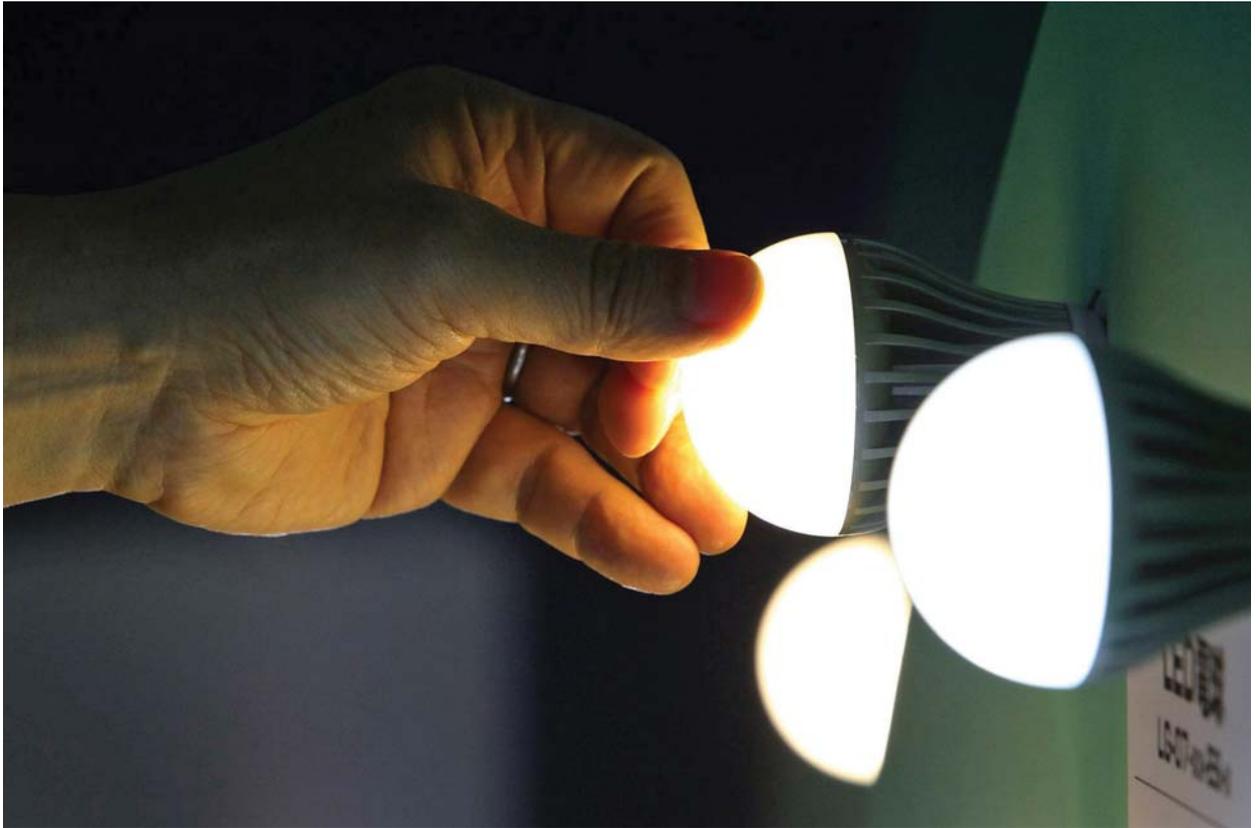


UJALA: LEDing To The Realm Of Energy Efficiency



The UK is readying to import its lock, stock and barrel. A few countries are closely studying it with the intent of imbibing it. But, it is in India that the world's most ambitious LED distribution programme is redefining the way electricity is efficiently consumed and an ecosystem for cost-effective lighting products created.

Towards the beginning of 2015, India initiated the world's largest light-emitting diode (LED) distribution programme with targets that could only be termed overtly aggressive. To be implemented by the energy service company (ESCO), Energy Efficiency Services (EESL), in conjunction with electric distribution utilities, a total of 770 million LED lights are to be distributed by March 2019. This is projected to result in an annual energy saving of 105 billion kWh and reduction in

peak load by 20,000 MW. It is also likely to reduce CO₂ emission by nearly 80 million tonne (MT).

A conventional light bulb converts only 5 per cent of the electrical input to light. On the other hand, the energy-efficient LED bulb consumes only one-tenth of the energy used by ordinary bulbs to provide similar or better lighting. To help consumers overcome the high cost of LED, the government started the Domestic Efficiency Lighting Programme (DELP) on bill financing scheme under the flagship Unnat Jyoti by Affordable LEDs for All (UJALA)

programme, the acronym simply implying “light” in Hindi.

The main objective of the UJALA programme is to promote efficient lighting, create awareness about efficient equipment that reduces electricity bills and preserves the environment. The programme replaced the Bachat Lamp Yojana, which was launched to distribute the compact fluorescent lamps (CFLs) to households. Concerns over the presence of mercury in CFL lamps were among the primary reasons behind the shift to LED.

By the end of June 2018, over 300 million LED lights were distributed through special counters in cities. Moreover, EESL's Street Light National Programme (SNLP) was instrumental in retrofitting over 6.1 million conventional street lights with LEDs in 941 municipalities across India. This has led to average energy saving of 4,097 million units annually and reduction of 2.82 MT CO₂ per year. “Besides the return on investment (ROI), our business model has reflected human impact, with well-lit and safe streets enabling businesses to stay open longer and providing better driving conditions,” surmises **Saurabh Kumar, Managing Director, EESL.**

Kumar, who has been at the helm of affairs at EESL since 2013, has been leading the programme from day one as the head of the company jointly owned by the state-owned NTPC, Power Finance Corporation (PFC), Rural Electrification Corp. (REC) and Power Grid Corp. of India.

Electricity consumers across all 29 states and seven union territories with a metered connection from their respective electric distribution company can get the LED bulbs at about 40 per cent of the market price. They also have the option of paying for the LEDs in equated monthly installments. Under the programme, 20W LED tube lights and India's Bureau of Energy Efficiency (BEE) five-star rated energy efficient fans are distributed. The prices were further rationalised following the implementation of the Good and Services Tax (GST) in July 2017. The 20W LED tube lights are 50 per cent more energy efficient than conventional 40W tube lights and are available for Rs 220. The energy efficient fans are considered 30 per cent more energy efficient than conventional models and are priced at Rs 1,200 per unit.

Three years down the line what had made UJALA into a textbook case? So much so that the plans are now afoot to export the concept to even the UK. “It is important to understand that the government is the biggest marketer in India. Therefore, if it has taken up an initiative of this magnitude, the kind of awareness that is generated among all stakeholders is bound to be very high. We find a lot of demand getting generated due to the effort,” opines **Vivek Yadav, Senior Vice President, Havells India Ltd.** He adds that such government initiatives are not only helping expand the market for certain lighting and electrical products but also challenging domestic manufacturers to innovate and enhance their product lines.

Creating demand through incentives

Upon being quizzed about the success of the programme, Kumar declares, “The upfront cost is borne by EESL and the monetised savings over time are used to recover the cost of investment. This leads to a reduction of initial cost of adoption of transformative solutions.” This is mainly accomplished through innovative risk allocation of procurement, installation, service and maintenance, and aggregation of demand by including incentives for all stakeholders. Tenders are floated for large procurements to leverage economies of scale and benefits passed on to consumers to stimulate more demand.

The LED industry is projected to grow exponentially on the back of these initiatives. According to projections shared by the Electric Lamp and Component Manufacturers Association (ELCOMA) India, the leading body of lighting manufacturers in the country, it is expected to

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account for 60 per cent of the country's overall lighting industry by 2020. For his part, EESL's Kumar often likes to term UJALA as the Make in India programme's biggest success story as it has helped catalyse domestic manufacturing by creating favorable market conditions for the development of new and allied industries. The Indian LED market has grown nearly 10 times over the past five years, while annual domestic production has increased from approximately 3 million LED bulbs in 2013 to 62 million in 2015.

“UJALA has created an ecosystem for high-quality products even while enabling LED manufacturers to build a business that will potentially be able to compete internationally as it will also help meet the growing demand for affordable LEDs globally,” he asserts.

Rakesh Zutshi, President, ELCOMA India & Managing Director, Halonix Technologies, agrees with Kumar's assessment. He says, “The LED lighting market in India is projected to register a CAGR of over 30 per cent during the period 2016–21. In view of this, we expect the LED segment to grow between 40–45 per cent over the next two years.” In Zutshi's view, the over

Rs 100 billion lighting market represents a colossal growth opportunity for the players in the LED segment and could help the country become the hub of superior and affordable LED products.

Points out **Sumit Padmakar Joshi, Vice Chairman & Managing Director, Philips Lighting India**: “Consumers in India are increasingly becoming more aware of their responsibility towards the environment and are switching over to energy efficient lighting. They are looking forward to smarter and energy-efficient homes, offices, retail outlets, and thereby fuelling demand for LED lighting.” In the past few years alone, Philips has witnessed a significant rise in demand for LED lighting products on account of the increased awareness about environment protection among consumers.

“High energy savings, longer life, lower energy costs, modular designs and ease of use are some of the potential drivers that will boost the adoption of LED lighting in the coming years,” avers Zutshi.

In fact, UJALA's success has motivated municipal bodies to also look for out-of-the-box solutions. In Delhi for instance, the North Delhi Municipal Corporation (NDMC) has given a contract to the Indian electricals and lighting major Havells to replace 2,10,000 sodium light fixtures with LED at their own cost. “We would get a payback in terms of energy that is saved over a period of

seven years,” informs **Anil Bhasin, Executive Vice President, Havells India**, while explaining the contours of the overall deal to POWER TODAY.

Redefining stakeholder relationships

The success of the UJALA programme has also resulted in a paradigm shift in the relationship between distributors of electricity and consumers as it has helped the former manage their loads better and they, in turn, have been helping to propagate the benefits of energy efficiency to consumers. For instance, in the 2017-18 fiscal, Tata Power aided distribution of over 110,000 LED bulbs to its Mumbai-based consumers. “Lighting systems consume around 17 per cent of the total energy generated in the country. Thus, it is time to abandon the antiquated technologies and embrace new ones, emphasises **Praveer Sinha, CEO & Managing Director, Tata Power Co.** In addition to having launched several demand-side management (DSM) programmes for promoting efficient use of energy, India's largest integrated power company is actively encouraging consumers to switch over to LED lighting products.

Products innovations that are commensurate with the worldwide trend towards digitalisation are expected to provide a fillip to the expansion of LED lighting. Or as Philips' Joshi states, “This evolution indicates a tectonic



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shift in technology from electrical to electronics. In turn, this may represent a significant growth opportunity for companies offering electronic hardware or components and solutions used in LED lighting, with functionalities across homes, public and professional lighting.”

The players in LED lighting are gearing up to handle the foreseeable growth in LED penetration. As one of the leading global players in the Indian market, Philips spends 5 per cent of its sales revenue on R&D on developing new solutions in lighting technology. “In India, we have our research and innovation centres in Noida and Bengaluru

to deliver local innovations for the Indian market and also develop software solutions for the world.” The company recently inaugurated a Remote Operations Center in Bengaluru to manage its connected lighting installations across the world, remotely from the city that is often billed as India's answer to the Silicon Valley. It has also announced the launch of Light Fidelity (LiFi)-enabled luminaires from its existing office lighting portfolio. LiFi is a technology in which high-quality LED lighting provides a broadband internet connection using light waves.

At a time when digitalisation is driving much of innovation and disruption, the Indian companies too are in the process of gradually upping their R&D spends. Halonix has a modern laboratory approved by the National Accreditation Board for Testing and Calibration Laboratories (NABL) within its manufacturing facility in Haridwar for testing and development of products. Havells has indicated plans to boost its spend on R&D from the present 1 per cent of the total sales revenue to 4 per cent over the next few years.

And this unparalleled transformation in the Indian lighting universe has been wrought without provisioning for any kind of subsidy.

— MANISH PANT

“LED lighting programme sets off a supply–demand chain reaction”

In an exclusive interview to POWER TODAY, Saurabh Kumar, Managing Director, Energy Efficiency Services (EESL) explains how the LED lighting programme has been a big game changer.



How many municipalities in India have partnered with EESL for the provision of LED lighting under the energy services company (ESCO) model at the last count?

India's streetlights form a crucial component of the nation's investment in lighting and road safety. Launched in 2015, EESL's street light national programme (SNLP) has been instrumental in retrofitting over 6.1 million conventional street lights with LEDs in 941 municipalities across 28 states and union territories in the country. This led to the saving of 4,097 million units of energy per year and reduction of 2.82 million tonne greenhouse gas (GHG) emission per year on an average.

Besides the return on investment (ROI), our business model creates human impact. Well-lit, safe

streets enable businesses to stay open longer, besides providing better driving conditions. Many states have shown interest in SLNP after seeing its real-time benefits on our online dashboard. The response that we have received from states, urban local bodies, and citizens is very encouraging. We aim to build on this momentum and retrofit 13.4 million streetlights by 2019.

How many bulbs did EESL replace with energy-efficient LED solutions from the time of conception of the programme till the end of FY 2017–18 across India?

Till the end of FY 2017–18, under the UJALA programme, EESL had distributed 294.6 million superior quality LED bulbs to domestic consumers covering 36 states and union territories.

What would you consider as the main reasons for the overwhelming success of the programme?

EESL's innovative business model of zero subsidy, zero capex, and pay-as-you-save obviates the need for any upfront capital investment in any of the interventions.

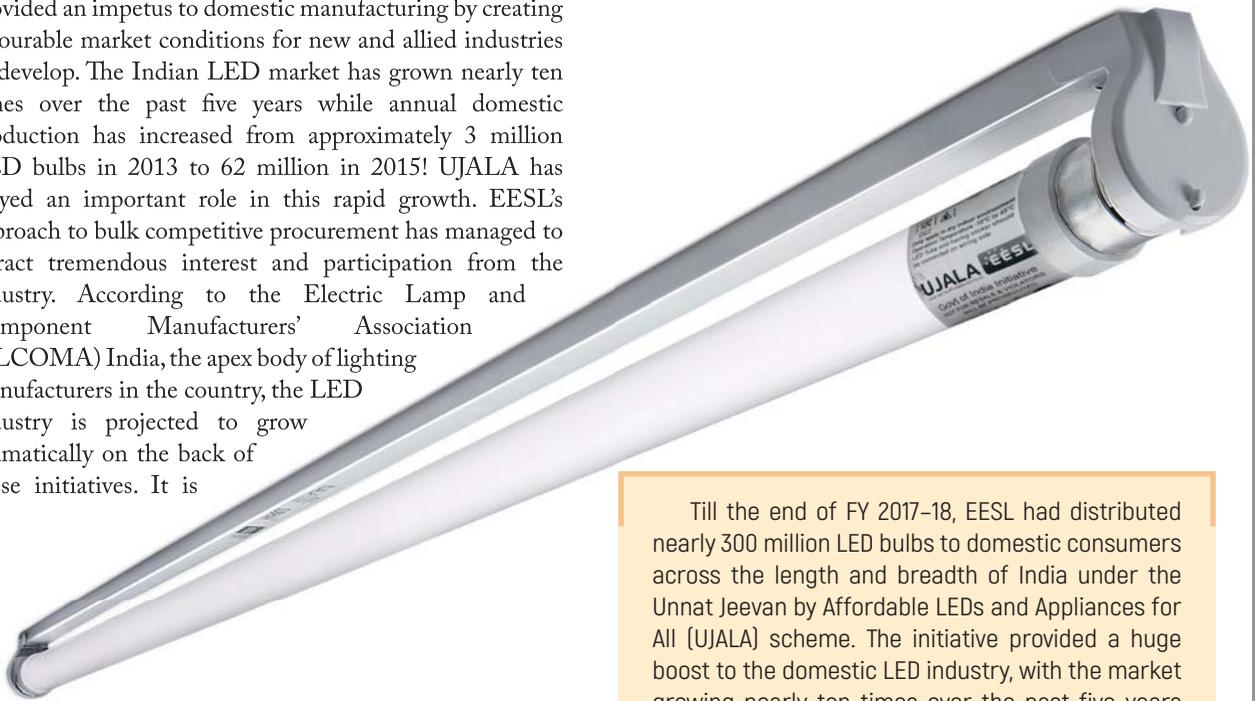
The upfront cost is borne by EESL and the savings monetised over time are used to recover the cost of investment. This leads to a reduction in the initial cost of adoption of transformative solutions. This is mainly achieved through innovative risk allocation of procurement, installation, service, and maintenance; aggregation of demand by including incentives for all stakeholders; putting out large procurements to leverage economies of scale; and the virtuous cycle of passing on the benefits to end users for more demand aggregation.

In your January 2018 interview with POWER TODAY, you termed the LED revolution as the country's biggest Make in India success story. How has it helped manufacturers of LED lighting solutions?

Under the UJALA programme, EESL has



provided an impetus to domestic manufacturing by creating favourable market conditions for new and allied industries to develop. The Indian LED market has grown nearly ten times over the past five years while annual domestic production has increased from approximately 3 million LED bulbs in 2013 to 62 million in 2015! UJALA has played an important role in this rapid growth. EESL's approach to bulk competitive procurement has managed to attract tremendous interest and participation from the industry. According to the Electric Lamp and Component Manufacturers' Association (ELCOMA) India, the apex body of lighting manufacturers in the country, the LED industry is projected to grow dramatically on the back of these initiatives. It is



Till the end of FY 2017-18, EESL had distributed nearly 300 million LED bulbs to domestic consumers across the length and breadth of India under the Unnat Jeevan by Affordable LEDs and Appliances for All (UJALA) scheme. The initiative provided a huge boost to the domestic LED industry, with the market growing nearly ten times over the past five years and domestic production rapidly expanding from 3 million bulbs in 2013 to 62 million in 2015.



The National E-mobility Programme is planned and executed in key states including Andhra Pradesh, Gujarat, Maharashtra, Rajasthan, Madhya Pradesh, Telangana, and Uttarakhand.

expected to constitute approximately 60 per cent of the overall lighting industry by 2020.

The overall impact of the programme is creating a full supply-demand chain reaction, which delivers favourable economies of scale to a range of manufacturers and strengthens the domestic LED market. UJALA has created an ecosystem for high-quality products, even while enabling LED manufacturers to potentially be able to compete internationally, as there is a growing demand for affordable LEDs globally.

Any more interesting initiatives from EESL in the coming months?

The National E-mobility Programme was launched on March 7, 2018 by the Minister of Power, New and Renewable Energy, Raj Kumar Singh, in New Delhi. As on date, it is operational in Maharashtra, Telangana, and Madhya Pradesh. The programme is planned and executed in key states including Andhra Pradesh, Gujarat, Maharashtra, Rajasthan, Madhya Pradesh, Telangana, and Uttarakhand.

EESL floated the first phase request for proposal (RFP) for 5 million smart GPRS metres in Uttar Pradesh and Haryana on August 01, 2017. Following which, EESL is in the process of deploying 4 million smart metres in Uttar Pradesh and 1 million in Haryana over the next three years. Further, the second technical bid was floated by EESL on May 15, 2018, and the price bids of the qualified bidders will be unveiled shortly. In the second phase, another 5 million smart metres will be installed over three years in a phased manner. The states of Andhra Pradesh, Delhi, Telangana, Gujarat, Tamil Nadu, and Bihar have also shown interest in the programme.

- MANISH PANT

“We are encouraging consumers to switch over to LED”

India is a substantially large market for LED lighting products and, aided by government initiatives and its unique demographic advantages, the country will continue to expand at a healthy rate over the next few years, **Praveer Sinha, CEO & Managing Director, Tata Power Co** tells POWER TODAY in this exclusive interaction.



What motivated Tata Power to become a part of the Domestic Efficient Lighting Programme (DELP) and Unnat Jeevan by Affordable LEDs and Appliances for All (UJALA) programme?

In a power-starved country like India, energy conservation is the best way to serve the nation both economically and environmentally. Lighting systems consume around 17 per cent of the total energy generated in the country. It is time to abandon antiquated technologies and embrace new ones. The concept of energy-efficiency is integral to Tata Power's sustainable business objectives and, through initiatives like these, we wish to create a culture of energy conservation in the country. The idea is to encourage consumers to switch to new LED technology in the coming years.

How many LED bulbs have been distributed to consumers by Tata Power?

In the financial year 2017-18, we facilitated the distribution of more than 110,000 LED bulbs to our consumers in Mumbai.

What are some of the ways in which you are imparting the importance of energy management and conservation to your customers across India?

We have undertaken various initiatives in line with our belief in ensuring a greener and sustainable planet. Over the years, we have rolled out various consumer initiatives like multiple demand-side management (DSM) programmes for promoting efficient use of energy to communicate our goal of sustainability. Apart from this, we have also initiated Greenolution, which is a unique initiative that is not only participative but also engaging, responsive, and ever-evolving. Through Greenolution, Tata Power has rolled out various practices and programmes to popularise sustainability as a movement by making all stakeholders and the public at large a part of them.

Tata Power is also part of a group of 46 leading international companies working together to develop a global policy framework to combat climate change. Launched in January 2007, the 3C initiative or combat climate change is a global opinion group consisting of companies from a broad range of industries demanding integration of climate issues in markets and trade.

Consequently, what kind of savings have customers accrued on an average, as a result of your outreach?

The Energy Conservation Building Code (ECBC) sets minimum energy standards for new commercial buildings having a connected load of 500 kW or contract demand of 600 kVA. An innovative business model is provided through energy service companies (ESCOs) whereby the energysaving potential of an existing building can be captured and the risks faced by its owner addressed. We have also been relentlessly spreading awareness about resource conservation through Tata Power Club Enerji (TPCE), our nationwide resource and energy conservation movement that focuses on creating a first-hand realisation of the energy crisis and scarcity of natural resources.

(For full interview, log on to www.powertoday.in)

- MANISH PANT

“India to be a global hub of superior LED products”

With the country's overall lighting market valued at Rs 100 billion currently, there is ample room for further growth in the LED segment, says **Rakesh Zutshi, President, Electric Lamp and Component Manufacturers' Association of India (ELCOMA) & Managing Director, Halonix Technologies.**



What prompted Halonix to enter the LED business?

Understanding the potential of the LED sector and anticipating good growth in demand, Halonix Technologies entered the business early on, aiming to be a part of the LED revolution. Ever since, we have put together a large network of distributors and dealerships across India to ensure that our customers get their queries and requirements addressed expeditiously. As per our vision, this is the most effective way to strengthen the market, as prompt post-sales service is essential for complete customer satisfaction. Halonix offers time-tested and reliable LED lighting products that conform to all safety and performance criteria.

What are some of the potential drivers that will boost the adoption of LED lighting in the coming years?

High energy savings, longer life, lower energy costs, modular designs, and ease of use are some of the potential drivers that will boost the adoption of LED lighting in the coming years. The government is also doing a commendable job in promoting this segment by introducing many schemes like distribution of LED bulbs under Domestic Efficient Lighting Programme (DELP) and National Programme for LED-based home and street lighting, to different parts of the country including rural areas. Consequently, the demand for LED is growing at a robust pace in all these markets. At the Electric Lamp and Component Manufacturers' Association (ELCOMA) India we are committed to fulfilling this swift growth in demand. Simultaneously, we are also working towards transforming India into a global manufacturing hub of not only superior but also economic LED products.

What kind of opportunities do you foresee emerging in the LED segment over the next two years?

LED lighting market in India was projected to register a CAGR of over 30 per cent during the period 2016–21. In view of this, we expect the LED segment to grow between 40–45 per cent over the next two years. The ever-widening gap between electricity generation and demand in the country has fuelled the growth of energy-efficient LED lighting. The lighting market in India is worth over Rs 100 billion, and a major proportion of the demand is in the LED segment. Of course, that represents a huge opportunity for growth.

Can you elaborate on the kind of government projects your company has participated in till now?

Halonix Technologies has embarked on a mission to create a robust ecosystem for the manufacture of LED lighting solutions and add wings to Prime Minister Narendra Modi's ambitious Make in India programme. Halonix is pushing the credo of Make in India through its state-of-art manufacturing facility at Haridwar.

(For full interview, log on to www.powertoday.in)

– MANISH PANT

“Industry is undergoing a tectonic shift in technology”

The government's push to energy conservation, rapid urbanisation, increased consumer awareness, and new innovations will enable a widespread adoption of LED lighting solutions, according to **Sumit Padmakar Joshi, Vice Chairman & Managing Director, Philips Lighting India**. This will likely represent a significant growth opportunity for companies offering electronic hardware or components for the segment.



What prompted you to enter the LED business in India?

Consumers in India seek smarter energy-efficient homes, offices, and retail outlets, thereby fuelling the demand for LED lighting. We have witnessed a significant rise in demand for our LED lighting products, which attests the fact that awareness of LED lighting is increasing among consumers, together with their consideration towards conserving energy and protecting the environment.

We are the global leaders in LED, conventional and connected lighting in both professional and consumer categories. Our size and position across the value chain provide us significant economies of scale, allowing ongoing development of innovative technologies, products, and services. Innovation is core to our business. We hold more lighting and lighting controls patents than any other

lighting company, with approximately 90 per cent of these pertaining to LED and digital lighting. In the future as well, we will continue to innovate in LED to outgrow the market. Our strong foundation in LED light sources and luminaires, drive opportunities for innovation in connected lighting systems.

What are some of the potential drivers that will boost the adoption of LED lighting in the coming years?

The major drivers that will boost the adoption of LED lighting are the increasing number of government initiatives for energy conservation, rapid urbanisation, rising consumer awareness about energy-efficient products, and innovative products offered by the industry that are in sync with the overall trend of digitalisation. This evolution indicates a tectonic shift in technology from electrical to electronics. In turn, this may represent a significant growth opportunity for companies offering electronic hardware or components and solutions in LED lighting, with functionalities for homes, public, and professional lighting.

Can you elaborate on the kind of government projects your company has participated in till now?

We are working with several state governments and municipal corporations to create safer cities and public spaces for citizens. Optimum lighting levels in a city can significantly enhance the perception of safety as it helps to distinguish people, shapes, and objects so people can react faster to their surroundings. Visibility, a critical factor in road safety, can also be improved with the right lighting.

In the past, we have worked on street lighting projects in Naya Raipur city and Pune Municipal Corporation (PMC) together with TATA projects, Hyderabad Growth Corridor, and Department of Rural Development & Panchayat Raj in Tamil Nadu, to name a few. We have also installed Philips Colour Kinetics façade lighting solution at several prestigious government buildings like the Rashtrapati Bhavan, North and South Blocks, India Gate, and Ambedkar Memorial in New Delhi.

What focus does the company give to R&D in LED?

As the global leader in lighting, we innovate, design, build, and deliver world-class lighting systems embedded with intelligence and connected through software, to deliver capability to manage, monitor, and control lighting assets, and enable data harvesting and analysis for improvement of lighting operation and business performance.

We are pioneering breakthrough innovations in products, system architectures, and services, making bold investments in sensors, cloud-based controls platforms, connected lighting, indoor positioning technology, and consumer-based personalised lighting systems. At a global level, we invest approximately 5 per cent of our sales revenue in R&D to ensure that we remain at the forefront of lighting technological developments. We have over 16,000 patents, 1,000 start-up and technical partners, and state-of-art labs at our global headquarters in the Netherlands, China, and the US. In India, we have our research and innovation centres in Noida and Bengaluru to deliver local innovations for the Indian market and also develop software solutions for the world. We recently inaugurated our Remote Operations Centre in Bengaluru that can manage our connected lighting installations across the world, remotely from the city.

What kind of opportunities do you foresee emerging in the LED segment over the next two years?

Over the past few years, there has been a significant transformation in the lighting industry with the introduction of LED lighting. Its penetration has increased substantially over the past two years owing to enhanced awareness among consumers about its advantages, such as high durability and lower power consumption, in addition to its increased availability and reduced prices. The LED is fast replacing conventional lighting at workplaces, public infrastructure, industries, and homes.

However, the latest trend in the lighting industry has been the emergence of connected lighting, marking a significant shift, transforming lighting from a commodity item to a fully integrated system that can seamlessly connect with a wireless network or ethernet, allowing users to remotely control and monitor lighting systems. The new LED lighting systems can now connect and interact seamlessly with smart controls, networks, devices as well as apps to offer a customised and tech-enabled lighting experience, paving the way for a fully digital world. Philips Lighting foresees that this technology will significantly enhance a consumer's lighting experience at home and drive new business value for professional users.

What new products do you propose to launch this year and do you have plans to diversify into other segments as well?

We recently announced a new internet of things (IoT) platform, called Interact, which will enable our professional



Philips Lighting is the first global lighting company to offer LiFi-enabled luminaires a two-way, high-speed wireless technology

customers to unlock the full potential of connected lighting. The platform supports our company's strategy to deliver new data-enabled services as value expands from lighting products and systems to services. Interact is also the name of the connected lighting systems that will not only support customers to improve their lighting experiences but also generate and upload data to the Interact IoT platform. These connected lighting systems, offering a unified user experience, feature applications that address industry-specific verticals. Available now are Interact City for public space lighting, roads, streets, pedestrian areas, parks, and plazas; Interact Landmark for architectural lighting; Interact Office for offices and commercial buildings; Interact Retail for large retail and food stores; and Interact Sports for stadiums.

We also announced the launch of Light Fidelity (LiFi), a technology in which high-quality LED lighting provides broadband internet connection through light waves. As the lighting company for the IoT, Philips Lighting is the first global lighting company to offer LiFi-enabled luminaires from its existing office lighting portfolio. LiFi is a two-way, high-speed wireless technology similar to WiFi but uses light waves instead of radio waves to transmit data. With a speed of 30 MB per second (Mb/s) broadband connection, users can stream several HD quality videos, even while on a video call.



- MANISH PANT