The next wave in outdoor lighting is built on smart cities

by Martin Wittmann, team lead, marketing and business development for general lighting at OSRAM Opto Semiconductors

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The next wave in outdoor lighting is built on smart cities

With cost reductions and performance improvements already in play, outdoor lighting providers must now add value to networked lighting to enhance municipal safety and achieve sustainability goals, writes Martin Wittmann.

Martin Wittmann is team lead, marketing and business development for general lighting at Osram Opto Semiconductors (https://www.osram.com/os/).

The outdoor lighting industry is at a switching point. It has spent years working to drive down costs and improve performance and it has largely achieved those goals. Now it must retool its priorities and address a new challenge: Offer innovative technological features that give customers the power to use light in ways they have not before.

Semiconductor technology is transforming all sorts of other industries. Consider the automotive industry, for example. There is a wide range of technological innovation happening now in the automotive space, from infotainment interfaces to cutting-edge safety features (https://www.osram.com/os/ecat/OSLON%C2%AE%20Black%20SFH%204716S/com/en/class_pim_web_catalog_103489/global/prd_pim_device_2219879/), most of it driven by novel applications of chip technology. Now consider outdoor lighting, where there's so much room for innovation. The solutions you see illuminating our roadways, urban areas, and public spaces have not changed dramatically in years.

Yes, there has been progress in some segments. Five years ago, for instance, LEDs barely had any penetration in the market. Today, they're the gold standard. But we need to move beyond incrementally better LEDs. We need to inspire customers to embrace new lighting options and fuel growth throughout our industry.

The traditional complaint regarding outdoor LED lights is that they were cold and harsh, emitting an unpleasant glare. LEDs have come a long way since those early days, but they're still not perfect. As a company, we're working on technology advancements to make LED lighting warmer, more pleasant, and more human friendly. We're achieving this via tunable and specialized white spectra that provide benefits in a broad range of applications and help drive further adoption of LEDs.

We need to change the way customers see light — from light as mere utility to light as a smart solution that can add real value in a wide array of areas. The good news is that technologies exist to make this happen. With proper application, these technologies will empower outdoor lighting to profoundly improve the way people live, work and play.

Smart sensing on city streets

Today, many offices have lighting that senses occupancy. The lights automatically turn on and off when people enter or leave a room. We have also seen the benefits of LED lighting sensors in warehouses, where they help optimize the space and improve workflows. Intelligent light fixtures with the right sensing functionality can actually increase productivity by tracking the movements of goods and workers through the warehouse space and generating data for real-time optimizations.

In the past, street lights worked on a simple timer. They had two modes: on and off. And the light they emitted was "dumb" light. They provided too much light at dusk, for instance, or a fixture turned on too early at some times of year and too late at other times as seasons changed.

The same return on investment in office settings can be realized by cities in their outdoor lighting use cases. LEDs fitted with the right semiconductor technology can sense motion and proximity to deliver benefits. Yes, we still need good lighting on our roadways and pathways. That will always be the primary use of outdoor lighting. But there is more it can do.

Think about the energy and cost savings cities can achieve by automatically turning off street lights when no one is around. The energy footprint of outside lighting in most major cities, such as New York or Los Angeles, is enormous. By adding smart motion sensing throughout downtown areas, cities can significantly reduce their energy consumption and improve their budgets.

Advanced power electronics and sensing can be combined to improve the delivery of light. We now have the ability to adjust artificial illumination levels according to the available natural light smoothly and precisely. So a street light might dim when it's still bright out and intensify when it's cloudy and darkness comes early. This kind of daylight harvesting can provide huge energy-savings benefits because it maximizes the use of natural light and minimizes the use of artificial light.

Air-quality sensing is another potential application, especially in locations such as Asia where air pollution is a serious issue. Smart cities can use the sensors in street lights to monitor carbon dioxide levels, for instance. These smart lights can even project warning messages on the sidewalk when air quality reaches unsafe levels.

Light and public safety

As we've discussed, lighting can provide much more than ambient illumination. Used in creative new ways, it can provide useful information and messaging to people in public spaces. How would this work? A street lamp could project all sorts of messages, from an advertisement on the sidewalk to an accident alert on the road.

This kind of technology is already making its way to market in the automotive space. For example, adaptive headlights increase safety at night or in low-light conditions by improving visibility around corners and over hills. In the future, adaptive-beam headlights might also send messages or project information in front of a vehicle in order to communicate with pedestrians or other cars on the road, such as flashing a message to pedestrians that it's now safe for them to cross the road.

Messaging technology could also be put to use in outdoor lighting. Imagine a parking garage where the lights direct traffic or flash directions like "Turn right to access Highway 101." Addressable micro-structured LED chips can be used in outdoor lighting to project this kind of valuable information.

The outdoor lighting industry has the opportunity to drive innovation beyond the adoption of efficient and cost-effective LED lighting. When we bring all the benefits of semiconductor technology to LEDs, we will enable exciting new applications in many areas of outdoor lighting. It's up to us in the industry to open our eyes and envision the many opportunities ahead of us.

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