

CLEVER LIGHTING

An Emerging New Market

Strategies for Creating Differentiated LED Products for Use Now

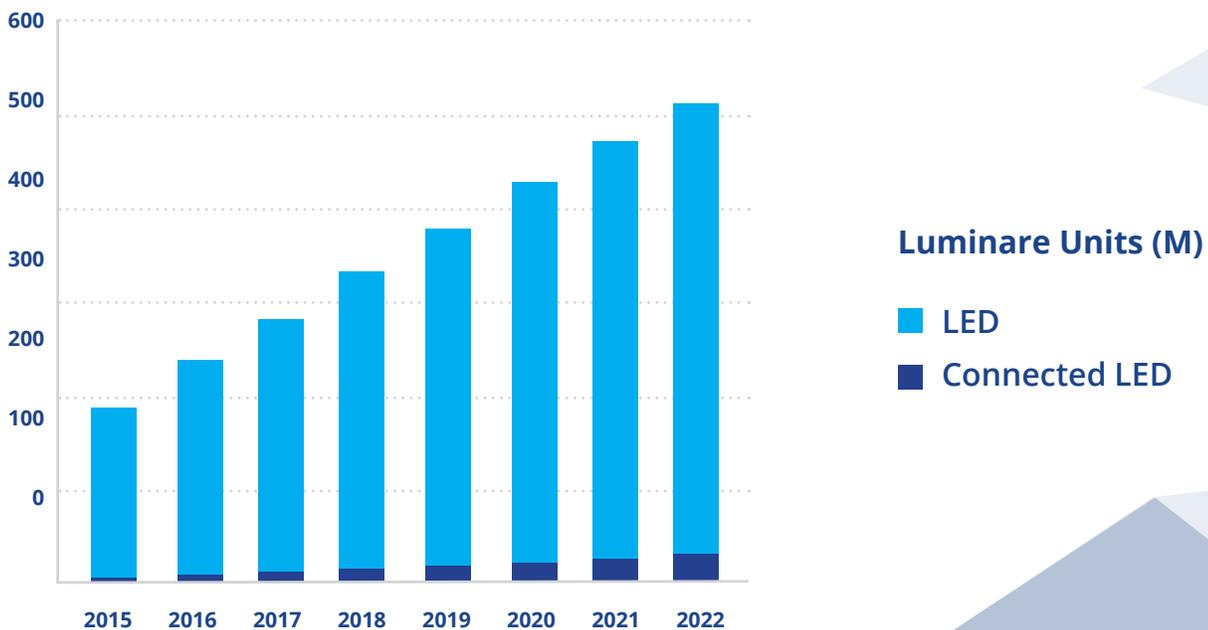
The mass adoption of LED technologies has been a tremendous force in reducing energy consumption and the overall cost of new LED lighting technologies. This success has also created a significant challenge. The LED lighting industry now finds itself at an interesting transition period, where it continues to increase its presence in commercial lighting (which has typically had higher margins than the residential lighting market) while simultaneously facing increased competition. While competition has always been a hallmark of the lighting industry, with LED being a digital technology a new group of low-cost manufacturers has entered. This abundance of manufacturers who are expert in producing low-cost digital products offer white box fixtures that attack the largest segments of the industry, especially troffers and downlights. These fixtures, which do not take full advantage of the unique attributes of LED, have led to lighting margins being compressed, in turn threatening the financial viability of many luminaire players.

Participating in the new technology lighting business has historically been a “wait and see” game, where over time competitors shake out, leaving only the large or targeted niche players. With LED, the dynamics seem very different. Rather than just lighting players and small start-ups competing with the new technology, very large digital manufacturers are entering, bringing new giant competitors willing to accept gross margins significantly below historic industry norms. They are already dominant forces in the market and have driven LED lighting commoditization much faster and earlier than with other lighting technologies.

So, what are lighting manufacturers to do? To avoid these decreasing margins and circumvent staying in a commoditized market, several manufacturers have continued to invest in lighting innovations, with the most prominent being an ever-increasing number of “smart lighting” products. However, the technological complexity of these intelligent products and the difficulty in proving their value to potential end users have stymied their penetration into the market.

For this reason, Strategies Unlimited reports that global shipments of connected LED lighting products in professional applications were less than 3% of all LED lighting shipments in 2016 today and that by 2022, these connected lighting shipments market will comprise less than 10% of the total.

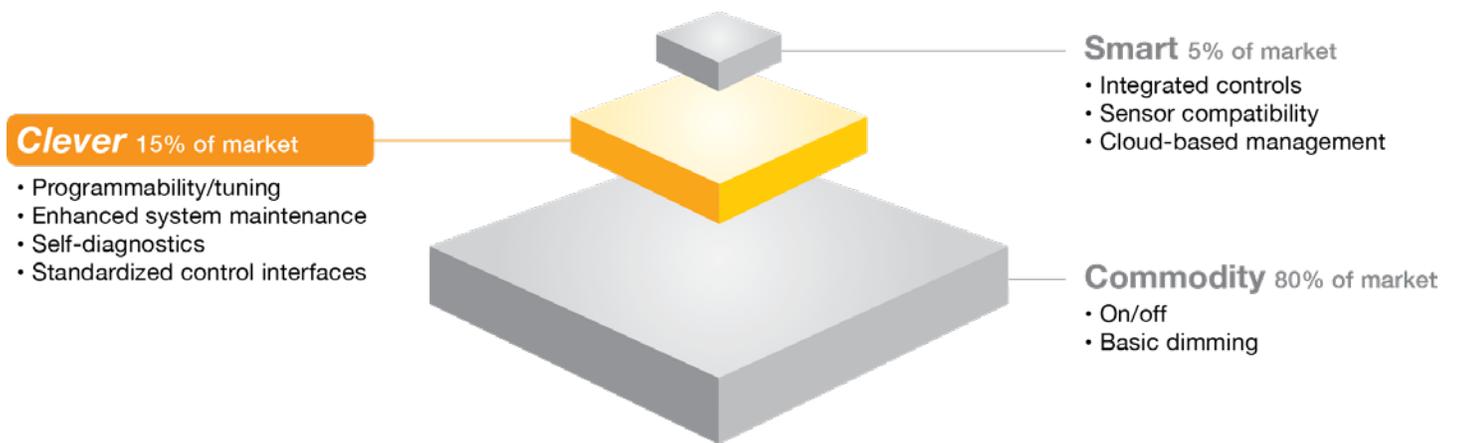
...by 2022, these connected lighting shipments market will comprise less than 10% of the total.



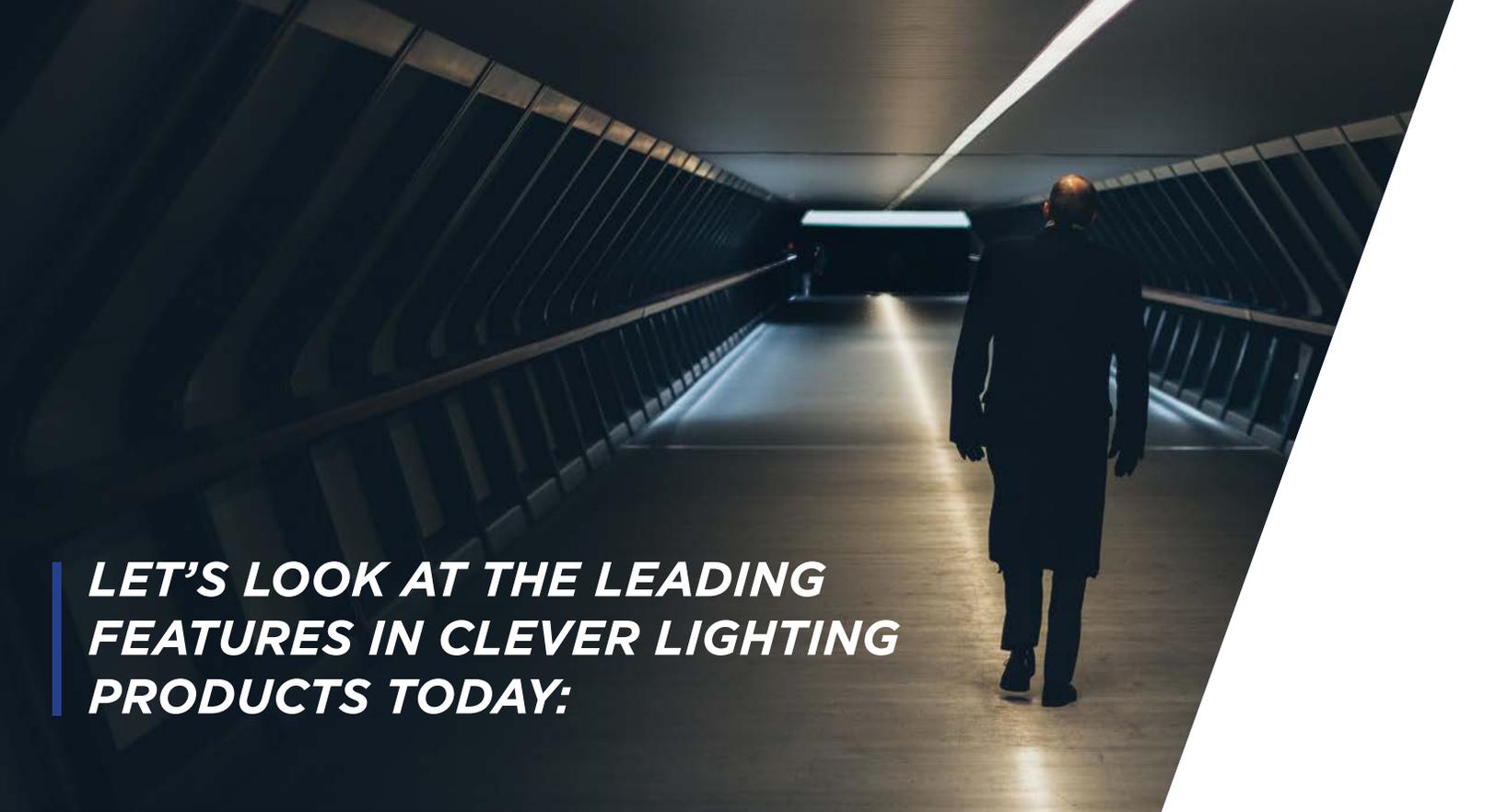
New Path Emerging

This challenge with “smart lighting” product offerings is leading some manufacturers to create and focus on a new LED lighting market segment dubbed “clever lighting.” Clever lighting is not a feature or future technology, but a way to provide value to customers on the path towards fully smart lighting.

Fulham, one of the first companies to see and help drive this segment, defines clever lighting as using the unique attributes of LED light combined with a solid understanding of the customers being served, to solve real problems for end customers, or for those in the lighting value chain.



The clever market is evolving because manufacturers seek to better serve their customers by leveraging the unique attributes of LED to differentiate their solutions for targeted applications. Done properly, the value is recognized by the end users, and they are willing to pay a bit more for the product, resulting in a sustainable business for the lighting manufacturer. Survival for many in the LED industry demands their thinking and product offerings move from commodity to clever.



**LET'S LOOK AT THE LEADING
FEATURES IN CLEVER LIGHTING
PRODUCTS TODAY:**

More Light Source Control

While dimming has become an expected feature of most LED lighting products in the market today, there are still issues with controlling lumen output while maintaining a level CCT across multiple luminaires. A feature such as programmable dimming curves offers better lumen and CCT control with 0-10v dimming, providing a more consistent lighting installation. This is not only essential for the comfort of individuals under these lighting products but also key for companies manufacturing “Human Centric” lighting products.

Another use case addresses the irregular lighting patterns that can arise with the addition of new luminaires to an existing area, as they will tend to have better efficiency and deliver more lumens when supplied with the same power. By offering tunable output drivers, lumen output from the new luminaires can be tuned to match the rest of the installation, independent of the fixture type used.

More Intelligent System Maintenance

Clever lighting products also use design characteristics that create better systems that last longer, provide better light quality throughout their lifetime and have reduced maintenance costs.

An example of this would include being able to monitor the temperature of lighting systems during operation, allowing for real-time adjustments to be made to the LED modules. Tuning down lumen output during hotter conditions decreases the operating temperature of the luminaire, extending its life by helping to avoid early failures and reducing HVAC costs for the space.

Superior flicker control is another attribute of clever lighting systems. LEDs that flicker during normal operation are not only a nuisance but produce spaces that are difficult to work in and may be a health hazard. This problem has been so prevalent that California's Title 24 provided standards for the amount of flicker that is allowed for lighting products being installed in the state. Now other Lighting Standards bodies are addressing the issue. Flicker wreaks havoc on security cameras, since it creates a strobe effect, decreasing their effectiveness. Clever LED products – built with clever drivers and LED light sources – can address all of these problems.

Some clever lighting systems can have start-up power requirements that are up to 80% lower than competitors who do not control their initial inrush current. By controlling the initial inrush current, lighting designers can create systems with dramatically reduced costs. Lower inrush current means less power is needed to start up a lighting system, enabling more luminaires per electrical circuit, reducing the number of required overall circuits while significantly reducing installations materials and labor costs.

...start-up power requirements that are up to 80% lower than competitors...





Driver Diagnostics

The primary item that fails in luminaries is its power source, the driver. Enhanced driver diagnostics leverages the digital design aspects of Clever LED Lighting to provide real-time status and predictive failure mode projection. Clever drivers offer the ability to track their operating attributes as a step towards getting into fully smart systems that could close the loop and provide automatic driver adjustments.

For example, tracking the hours of operation and hours over a specific temperature provides the ability to understand the environment the driver and luminaire are used in resulting in warranties based on actual usage hours rather than a more random number of years.

Standardized Control Interfaces

By using standardized control interfaces, technologies, and protocols, multi-vendor lighting products can be installed in the same room, area, building, campus or municipality and be controlled by a single control system. Integrating these types of technologies into today's lighting products adds flexibility and upgradeability for the future, which promotes multi-vendor control systems. While most lighting control protocols are still proprietary, there are a few starting to embrace the idea that lighting controls work best when they can interface with any manufacturer's luminaire.

While most public street lighting projects today do not include controls, cities/municipalities/utilities may wish to add controls from any vendor that supports the ANSI C136.41. This interface provides a standard way to attach control nodes to the luminaire once installed in the field. The DALI interoperable control network primarily used outside the U.S doesn't provide everything that may be desired in a control system, but its heavy usage in places like Europe is proof that a multi-vendor control system can provide additional energy savings while gathering important data for facility or system optimization.

