

# Arbor Capital Markets

## Market Update

December 2017

### LED Lighting Industry Connecting to World and Health

Last month Arbor Capital Markets announced its new focus on the LED lighting industry commensurate with its new partnership with industry expert Keith T.S. Ward and ACM's engagement of Arborlight, Inc., as ACM's latest client. Arborlight, an Ann Arbor, Michigan company is focused on developing and selling patented, proprietary Daylight Emulation® IoT-LED luminaires.

- Our November Newsletter addressed the transition from conventional lighting to LED's and reviewed the consolidation of lighting and fixture companies; noting recent transaction metrics.
- This Newsletter we will review the transition to the new generation of Smart Lighting driven by Human Centric Lighting (HCL) and IoT-connected LED's and their effect on industry consolidation.
- Our January newsletter will explore the nexus between Health, Productivity and Light and will focus on Circadian Rhythm and the companies involved in this dynamic space.

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*The LED industry is on the cusp of a technological revolution that is changing how lighting is used throughout the industry, how the lighting industry impacts our lives and wellness, and shaping industry consolidation. LED lighting is connecting appliances, buildings, and even entire cities and tunable lighting is being configured to affect our moods, productivity, and health.*

Initial commercial adaption of LED lighting in the late 20<sup>th</sup> century was slow; the benefits of brighter longer lasting light did not offset the high cost of product implementation.

More recently, however, due to manufacturing improvements to larger wafers, the acceleration of efficacy in mid-power LED designs and an influx of Asian producers that have gained global scale, the cost of LED's has dropped



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dramatically, spurring more aggressive pricing and unit demand. Demand has also been bolstered by emerging markets and global political mandates driven by environmental and energy concerns.

In this paradigm the primary economic benefits of the technology are seen as energy efficiency, compact size, long life and ease of maintenance, resistance to and breakage and vibration good performance in cold temperatures, lack of infrared or ultraviolet emissions, instant-on performance, color control, reduced flicker, and the ability to be dimmed. In other words, the primary decision metrics are limited to traditional considerations such as the expense of installation, maintenance, and product life, and stable and bright light.

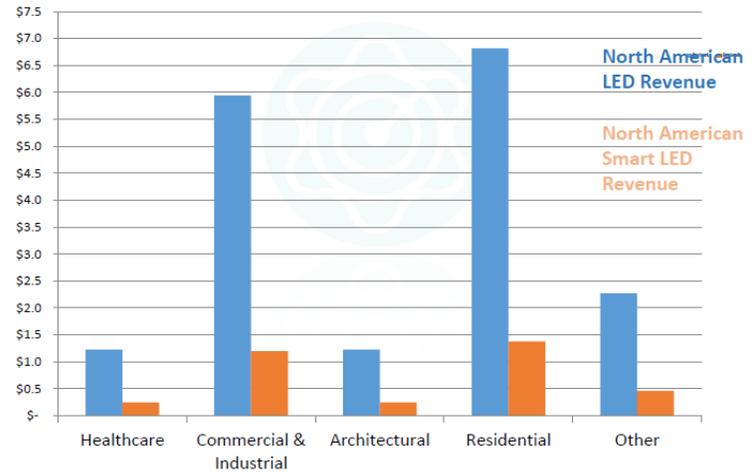
While, historically, the focus of the lighting industry has been designing products to fulfill our visual needs, in the past several years the industry has also been shaken by a technological revolution that promises to change the nature of the lighting industry itself as well as its impact on our everyday life. Though the energy efficiency and durability of LED products/modules are widely known in the market, until recently little attention has been paid to their capacity for tune-ability, advanced controllability, and related applications.

***Modern trends such as urban migration, spending more time in interior rooms, traffic congestion, energy efficiency, and living longer have amplified efforts for lighting to have more control and positive impact on our lives; specifically using tune-ability and IoT controls to control our environment for healthier and more efficient living.***

***These trends find application in smart buildings where tune-ability and connectivity control human mood, wellness, and productivity and controls drive energy efficiency to managing traffic congestion through controlled street lights and outdoor lighting, to driverless cars where the added sophistication of the lights' capability and connectivity prevent accidents.***

## North American LED Lighting Market

By Application Segment, Projected to 2022(\$b)



Source: Industry Reports and ACM calculations

The industry is entering the next generation of lighting based on tune-ability and its ability to control biological stimuli through Human Centric Lighting (HCL) and IoT controls. As a result, the economic impact of lighting is expanding exponentially. In the traditional paradigm, the cost of lighting was weighed against the benefits of reducing a building's energy budget; lighting's impact was thus limited to shaving a few points off what might amount to 2% of a company's budget. The extensive impact of HCL and IoT, however, mean lighting has cost impacts far beyond a company's cost of lighting and energy budget. Lighting can now impact the entire flow of cities, wellness of patients, student learning, and for companies; lighting affects employee productivity directly allowing a more significant impact on up to 90% of corporate budgets.

Various industry experts project the total global LED market, currently estimated at \$33 billion will grow at a 23 percent annual rate to over \$92 billion by 2022. Of particular importance is the smart LED market which represents roughly 20% of the overall lighting market. According to Strategies Unlimited, the number of connected outdoor lighting units will increase from 1.66 million in 2014 to over 30 million units by 2022, with the LED share of those shipments increasing from 45 to over 73%. The number of connected indoor lighting square foot installations will increase from 1.26 million in 2014 to over 1.46 by 2022, with the LED share of those shipments increasing from 56 to over 82%.

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## Smart/IoT Drive LED M & A Transactions

The LED industry is truly transforming the lighting industry, setting off a consolidation frenzy as companies confront the numerous technological and market challenges over the next decade.

As the old business model, driven by replacement of commodity bulbs and fixtures disappears, the IoT-Smart and Human Centric Lighting applications become the key drivers in the growth of the industry and its consolidation.

- German-based Osram is over 100 years old, but a leader in driving industry technology and consolidation, including three acquisitions in the summer of 2017. Osram's August acquisition of Boston-based software company Digital Lumens strengthens its portfolio for IoT-applications based on connected lighting systems in industrial buildings. **The Digital Lumens software platform** enables Osram to expand its business with digital lighting solutions and add to its expertise in software, sensors, and connectivity.
- In July Osram purchased an interest in Canada-based Leddar Tech, Inc. LeddarTech develops advanced detection and ranging systems based on the sensing technology that performs time-of-flight measurement using pulses from infrared LEDs processed through algorithms. Its products include sensor modules and IC's. In June Osram purchased California-based LED Engin. LED Engin offers LuxiTune, a single-emitter tunable white light engine and develops, manufactures, and sells advanced LED emitters, optics components and light source modules in a unique, high-lumen density, compact, multi-die package that

enable solid-state lighting solutions for a wide range of applications.

- In November 2016, in a move predicated on the growth of "smart city technologies" Osram purchased a 48% interest in Netherlands-based Tvilight; an industry pioneer in employing sensors, controls and connectivity to digitally manage streetlight management.
- In April Hubbel Inc. paid \$60 million for iDevices, a leader in the connected home industry. Hubbell strengthens its innovation engine with iDevices' knowledge and expertise in the connected Internet of Things (IoT) marketplace.
- Also in April AB Fagerhult, recognizing that lighting controls and data analytics are an increasingly important part of the lighting solutions space, acquired the intellectual property and assets of Organic Response Ltd. Organic Response develops cloud based data analytics and a lighting control platform, which allows remote monitoring and control of lighting assets.
- In September of 2016 cellular phone giant Verizon acquired Silicon Valley-based Sensity Systems. Sensity System products convert older lighting systems to connected LED systems, making them controllable remotely. Sensity is a leading provider of IoT solutions for smart communities with a strong ecosystem of partners. This is a straight push for Verizon's wider Internet of Things "smart city" business, [ThingSpace](#), which will integrate Sensity's business and technology.

### Announcement

Date	Buyer	Target	Target Business Description
Aug-17	Osram	Digital Lumens, Inc.	Digital Lumens offers LightRules, a lighting and energy management software that includes mobile, power, insight, and API; LED high bay and linear lighting solutions; digital light agents, a standalone lighting control solution that allows various interior fixture to be a LightRules-ready member of an intelligent lighting system;
Jul-17	Osram	LeddarTech Inc.	LeddarTech develops advanced detection and ranging systems based on the sensing technology that performs time-of-flight measurement using pulses from infrared LEDs processed through algorithms. Its products include sensor modules and IC's.
Jun-17	Osram	LED Engin, Inc.	LED Engin offers LuxiTune, a single-emitter tunable white light engine; and lenses for multi-color and white LEDs. The company's products are used in architectural lighting, dynamic lighting, entertainment lighting, horticulture and specialty, analytical and curing, tunable white, and fixed CCT white applications.
Apr-17	Legrand North America, Inc.	Finelite Inc.	Finelite designs integrated classroom, office, and personal lighting systems. Its products include patented plug-and-play lighting systems.
Apr-17	Hubbell Incorporated (NYSE:HUBB)	iDevices, LLC	iDevices develops application-enabled products. It offers Bluetooth Smart modules that allow engineers to add Bluetooth Smart functionality to their products. The transaction value was \$60 million.
Apr-17	AB Fagerhult (OM:FAG)	Organic Response Pty Ltd.	Organic Response develops cloud based data analytics and lighting control platform, which allows remote monitoring and control of lighting assets.
Feb-17	LSI Industries Inc. (NasdaqGS:LYTS)	Atlas Lighting Products, Inc.	Atlas manufactures energy saving lighting products. The transaction value was \$97 million or 11X EBIT and 1.7x revenues
Sep-16	Verizon Communications Inc. (NYSE:VZ)	Sensity Systems, Inc.	Sensity Systems provides Light Sensory Network, a high-speed, sensor-based, multiservice, open networking platform that enables light owners to capitalize on the LED conversion process by embedding networking technology within retrofit and new LED luminaires. The company's NetSense integrates LED lighting, sensors, high-speed networking, cloud computing, and big data analytics into a multiservice platform.
Jul-16	IDG Capital Partners; Yiwu State-owned Capital Operation Co.,Ltd; MLS CO.,LTD. (SZSE:002745)	LEDVANCE GmbH	LEDVANCE light engines and modules, indoor LED luminaires, outdoor LED luminaires, electronic control gears for LED modules and dimmers, and light management systems; and lamps. The company also offers LIGHTIFY controls, smart home products, electronic control gears for traditional lighting, and services and tools. The transaction price was \$549 million

Source: S & P Global: Market Intelligence

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## About Us

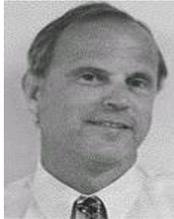
Greg has over 30 years of finance and investment banking experience as a senior executive and investor in early and mid-stage growth companies. He has served as a Partner in the Ernst & Young Corporate Finance Consulting Group as Managing Director of Alternative Investments for Telemus Capital Partners and as Credit



**Greg Buck**  
Managing Director

Officer for Citibank. He co-founded Leonard Capital Markets and prior to that served as a partner of M Group, Inc., an investment firm based in Birmingham, MI, where he focused on technology investments and diversified manufacturing and service company acquisitions. He graduated from the University of Michigan with a BA and holds a MBA from Western Michigan University.

John has over 30 years experience as an investment banker and business consultant. He was a lead investor and served on the Board of Relume, Inc (an LED pioneer). He began his private sector career as an investment banker , specializing in public offering and consolidation in the financial sector; first with Johnston Lemon & co. and then First of Michigan Corporation. In 1991 he formed JMP Financial, Inc. He began his professional career in Economic Policy with The Heritage Foundation, as Chief Economist to Dan Quayle and senior political appointee of President Reagan. He has an MBA from the University of Michigan and post graduate economics studies at George Mason University.



**John Palffy**  
Affiliate

Keith has nearly 40 years of lighting industry experience, including two decades of senior business leadership at Future Electronics, Luminus Devices, Inc., GE and Iwasaki Electric driving profitable growth companies, transforming traditional lighting companies while driving adaption of LED and the eco-system of supporting technologies. He was responsible for the successful restructuring and sale of Luminus Devices and is currently serving advisory/board director roles in for MLS, LEDvance, Forest Lighting, Alternative Lighting Technology, Global Value Lighting, Arborlight, Inc. and Standard Products. Keith has a BSBA from Clarion University of Pennsylvania and an MBA from John Carroll University..



**Keith T.S. Ward**  
Affiliate

M&A advisory options for companies valued between \$2 to \$20MM is limited and often times serviced with unlicensed “finders” and national firms selling “fill in the blank” offering memorandum’s.

**Arbor Capital Markets** believes there is a better way. We specialize in delivering high quality, fully licensed, corporate finance/M&A investment banking services to small and midsize companies at moderate fee levels. Our clients have the exclusive focus of senior deal makers who have closed and walked away from many situations over the course of their 30+ year careers.

**Arbor Capital Markets** takes the time to:

- Analyze and discuss your strategic goals and options;
- Create the business-specific plan to achieve those goals;
- Develop individualized marketing documents and plans that highlight the distinct advantages of your business and;
- Market your business to a focused prospective list.

### A Note to our Readers,

Arbor Capital Markets believes this Review indicates a continuing M&A interest in LED companies, but with a specific and increasing focus on companies offering Smart/IoT and/or Human Centric or tuneable technology. The larger companies continue to acquire technologically forward and strategic smaller companies for premium values. This activity is driving ACM to increase its focus on a consolidating industry and we encourage you to call us to discuss your company and how to maximize its value.

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