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Straight Talk on the Future of Lighting

by Terry Clark

With changes in technology will come opportunity, but also potential pitfalls, winners and losers

What does the future hold for the lighting industry in America? Twice within the past year I've been asked by the IES to offer thoughts on that very question. My answer, in a word: change. And that change involves everything from the light source and how it's controlled, to the strategies that manufacturers should adopt to capitalize on these advances in technology. What follows are some of the key trends currently driving the industry, and some questions we should ask moving forward.

Where are the opportunities? Every single segment of lighting is going to change—architectural, commercial, residential and outdoor—and new segments will emerge. Right now there are more than 250 LED-related projects on Kickstarter and over 1,000 on Quirky—mobile apps, clothing, programmable luminaires, games, watches, tools, et. al. It's crazy, amazing and exciting.

Let's take street lighting as an example. By January 2013, the City of Los Angeles had converted 140,000 out of 210,000 streetlights to LED. When the city began in 2009, it was paying $430 for a 41 lumens per watt fixture with an expected life of 80,000 hours. By 2012, their cost was down to $245 for an 81 lumens per watt fixture with an expected life of 150,000 hours. That's about half the cost for twice the efficacy and life. That is good. But, it is not good enough. To achieve mass adoption, I think that the price per LED streetlight will need to drop below $99.

The controls opportunity in street lighting is big. Los Angeles indicated that it has remote monitoring on about 54,000 lights. Their statement was that, "When remote monitoring and GPS controls costs get down to about $80 per unit, adoption will soar."

Office lighting is another good example of where new opportunities lie. We've gone from 5 watts per sq ft with the silver-bulb incandescent in the 1930s to the new ASHRAE/IESNA 90.1-2013 Standard calling for 0.9 watts per sq ft (**Figure 1**). Now, California's 2013 Building Energy Efficiency Standards are promoting 0.5 watts per sq ft as an achievable level of lighting power density in buildings.

Finally, light and health is an emerging growth area. Specifically, the impact that light level and color have on health will drive change.

What are the pitfalls? Whenever there are market shifts due to changes in technology the general pitfalls include:

- Falling in love with a technology instead of solving your customers' problems.
- Not changing fast enough—sticking with tried-and-true approaches too long will be fatal.

Lighting, in particular, has its own unique characteristics that create additional pitfalls:

- Commercial building owners don't pay energy costs. Why should they take risks?
- Energy usage requirements will never eliminate the demand for quality and

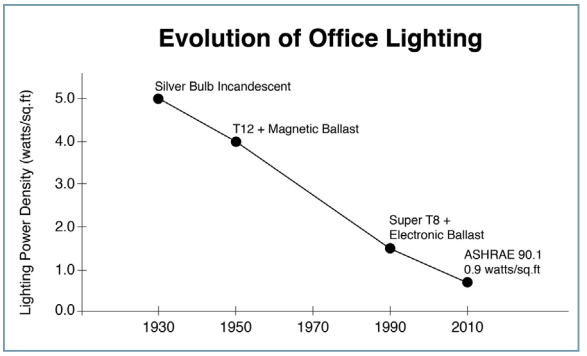

Figure 1.

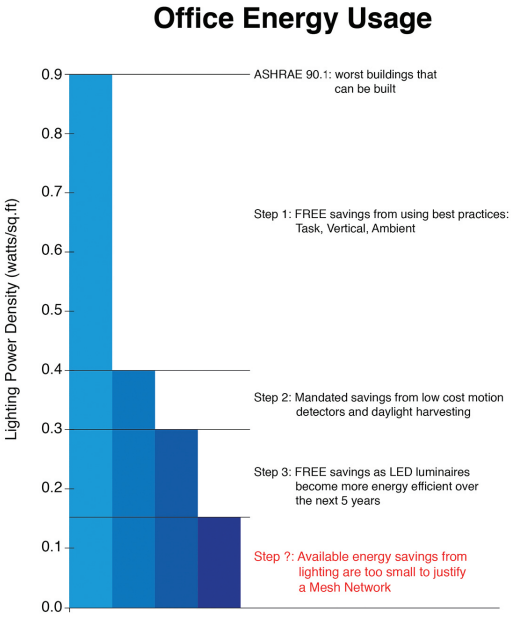

Figure 2.

art in lighting (remember the compact fluorescent bulb?).

- As lighting becomes more energy efficient, other technologies, such as HVAC upgrades, water conservation, white roofs and windows will compete for energy saving dollars.

And don't forget that when outsiders hear lighting folks talking about markets changing at the speed of light, they mistakenly compare our industry to more agile consumer markets. Everything is relative. Change takes three to five times longer in the lighting industry than in others. It is coming. Just not quite as fast as some expect.

Which technologies will win? It's all about LEDs—now and for the next 10 to 20 years. LED technology is moving at what the lighting industry perceives as warp speed. Every legacy light source is under attack by LEDs. And, they are all under attack at the same time. This is unprecedented.

Smarter sensors and new ways to control lighting will also continue to gain traction. Mary Meeker, a partner at KPCB, calls it "Mobile Mojo." The way we control nearly everything will change. In addition, easy-to-use communications protocols will also gain greater acceptance.

Which technologies will lose? First, OLEDs. The DOE states "OLEDs are at a crossroads." My belief is that OLEDs will remain a niche technology with limited energy-saving potential. Second, wireless mesh networks for offices may happen. However, they will not happen based on energy savings in lighting. It's a $5 solution for a 50 cent problem (**Figure 2**).

How will these changes impact our industry? Major conglomerates see an opportunity to gain market share and they are going for it. The bases of competition are changing. Some major players are looking at changing the product development model, some the distribution model, and some are pulling resources from outside industries—the semiconductor, mobile and sensor sectors. This means some niches may close and others may grow.

New protocols and standards will be needed so that non-proprietary systems of luminaires, sensors and controls can play together. Customers want smarter lighting systems, but not at the expense of choice.

And finally, research on how lighting affects health will cause other changes and provide opportunities. We may find we need different lighting for the young vs. the old, the sick vs. the healthy, the artist, the engineer and the economist. Hospitals, homes, schools and workplaces may want to be able to fine tune their lighting environment. Enabling them to do this in an affordable way will be a challenge for our industry.

So what does this mean for us? To meet these challenges, we will need to:

- Change faster than our customers.
- Embrace uncertainty.
- Pick our partners carefully.
- Pick a market segment and execute flawlessly.

Terry Clark is founder and chairman of Finelite, Inc. This article was adapted from Mr. Clark's presentations at the IES Annual Conference and at an event hosted by IES San Francisco Section.