

Seismic Industry Shifts

Events of seismic proportion wreak destruction and yield lasting change. Contrary to the tone of my Outlook inbox there are few lighting emergencies. We aren't faced with lighting tsunamis and earthquakes. We are an industry accustomed more to gradual change. However, incremental shifts can creep up on us like the frog in a slowly heated pot of water. If the temperature rises gradually the frog does not jump out. His leaps are over before he senses the emergency. Lighting is a sedentary industry. We have not needed and consequently have few advance warning systems. The accelerated pace of change and new threats described here should shake our complacency. Survivors will no longer conduct business as usual. Depending on our perspective, these major events may not appear threatening. A train or car viewed from a distance is small but quickly can encompass your entire field of view, or worse.

To bring value to students an educator must have relevant information or insight to share. Good educators by necessity are good researchers. They often plot trends, analyze data and position themselves to be knowledgeable on new topics so that they can inform their students. Some subjects change little with time. Classes on basics of electricity, color and light, methods of optical control, how a ballast functions, etc are similar in content wherever they are offered with the teachers skills being a more significant variable. When teaching new information, the effective instructor needs to be better informed than his attendees. That can put the educator on the front lines reporting important information back to the troops. At times of increased activity the teacher has to filter and prioritize what is most important for others to know.

We met today to plan our 2010 Calendar for the Lighting Solutions Center. Typically the predictable is disposed with quickly. Fundamentals classes are always in demand, application based sessions (office, retail, schools, etc) get peppered through the months. Industry conferences and events are layered in and then it gets tricky. This year was different. It took us hours to get started. We critiqued the previous year, the changes to our industry and attendee needs for longer than ever before. The passion and opinions were strong and could not wait. A shameless geek fest of issues revealing shifts, trends and drivers that will spark a search for knowledge emerged.

There are many ways to monitor changes in our industry. Working on the IES Progress Report Committee has been a favorite activity of mine since joining in 1991. We are tasked with reporting on "advancements to the art and science of lighting" every year. Some years we have reviewed the boring incremental "progress" of a CFL that is the smallest available by 1/32nd of an inch or backwards ideas like cool white T8's. Occasionally this group of lighting devotees is blown away by exciting game changers or inundated with submittals of emerging technologies. The biggest trend in 2006 was LED related submittals which made up 16% of the total. In 2007 they still dominated at 20%. 2008 submissions were 33% LED related. The 2009 count was over 40% LED related submittals. At this rate we will be 100% LED in a few years☺ New chips, drivers,

optics, fixtures and standards will all require training and education. Leading manufacturers are still scrambling for dominance in this market.

Perhaps it won't ultimately matter. Optoelectronic sources come from semiconductor manufacturers. Who were their customers prior to architectural lighting use? Not just Royal Philips Electronics, Inc but Toshiba, Sharp, Samsung and Panasonic all have lighting products now. Sharp has 11 LED area fixture types being sold in Japan and Panasonic is researching architectural applications of their new lighting products. Toshiba announced a new Lighting Systems Division in September. Let's look at their yearly sales (according to www.hoovers.com). Panasonic 113B, Samsung 105B, Toshiba 77B, Philips 37B and Sharp 34B (Hitachi is near 110B, LG is 81B and Sony 77B but they are not significantly involved in architectural lighting yet). Chip manufacturers like Nichia (2.3B) and CREE (567M) are dwarfed by these financials. The big 4 lighting fixture manufacturers annual lighting sales combined are less than a tenth of Panasonic's total sales. Chump change may be overstating our proportionate acquisition cost but if our shift continues toward solid state lighting the potential for assimilation of our industry into these firms who better understand this technology appears inevitable.

What new technology will follow the LED revolution and who understands it best? OLED's may be the general light source to replace conventional wide distribution sources such as fluorescent and HID. Lab results are showing up to 102 LPW and one OLED fixture claims to have met the Energy Star criteria. Many OLED products are on the market now. Sony is using this technology for televisions and Samsung has a light fixture that can also show video. Philips has clear OLED's that are opaque and emit light when turned on. Lighting manufacturers have hired physicists to progress with these new ways to generate light but are unlikely to have the time or resources to dominate these new markets for long. Some lighting manufacturers still refer to their companies as tin benders, a backwards thinking death knell. Nanotechnology is also outside of our expertise. The first nanotechnology lighting products will be sold later this year. Standards are being written for QE (quantum efficiency) to compare products as they position for market penetration. The first products will replace phosphors in LED lamps increasing the efficacy and allowing warm color temperatures with high efficacy now elusive with LED offerings. These products called Quantum Dots are not from the big 3 lamp companies. How many of us have a subscription to the Journal of Materials Chemistry where this technology is discussed? The distance from these industries to ours may not prove to be a cost effective trip. Survival will come from acquisition and it is clear based on the above financials who would be the buyer.

The combination of LED exterior lighting with solar generated power was evident at Lightfair and the Street & Area Conference this year. Wind powered LED fixtures have been used in China for years. The US generates only .5% of our energy from wind and solar energy. This will change soon. According to Deutsche Bank the cost of solar generated and conventional electricity will be equal in 2014. Efficiencies of solar are increasing. As kilowatt hour rates climb the ROI and LCCA of alternative energy becomes more compelling. The American Recovery & Reinvestment Act and other rebates are further stimulating alternative energy growth. Lighting Energy Service

Companies (ESCO's) and distributors are shifting toward solar and wind products including installation. One lighting ESCO owner told me that solar and wind is now 30% of his business and growing. Our industry has much to learn. Teaching about the interrelationship between lighting and alternative energy sources will keep our educational facilities busy for years. When we finally study the health effects of melatonin suppressing high color temperature sources like LED's it may be yet another game changer for us to talk about.

The LEED Standards reward alternative energy. Green Building is a seismic shift. It is estimated by McGraw-Hill to increase from a 12B market in 2008 to between 96 and 140B in 2013. Is there any other area of our industry or economy growing at this rate? We can anticipate a shortage of green ink as corporate marketing divisions posture their products and services as greener than thou. New construction has stalled, forcing a very strong paradigm shift for the lighting industry toward retrofitting and relighting our existing buildings. The USGBC claims that 160B annually can be saved by these upgrades. This potential has gotten attention in Washington with a focus in the ARRA/Stimulus Bill on building renovation. An economist at McGraw Hill told me that he thinks that 70% or more of the construction funding from ARRA for buildings is for improving existing building efficiency. Most lighting manufacturers sell through agencies that have traditionally counted on new construction. They have been slow to shift their business models toward upgrading existing buildings and many are downsizing. Real estate vacancies both commercial and residential would indicate that the situation is long term. The success of lighting ESCO's who typically target energy efficiency upgrades further validates the shift away from new construction. Important to this discussion is that retrofit used to refer to upgrading lamps and ballasts. Legislative restrictions mandate such low energy consumption that in most cases luminaires must be upgraded to comply, not just lamps and ballasts. A 3-lamp parabolic fixture with the most efficient lamps & ballasts will not meet the 2004 code but a high efficiency 2-lamp unit will. For decades most fixtures sold on price not efficiency. Higher reflectance materials, precise optics and other premium technologies increase efficiency beyond existing commodity low cost products. It's not just about lamps and ballasts anymore and educators must tell the story.

Energy savings are the carrot and legislation is the stick. The stick is getting bigger and hitting our industry harder than ever. ASHRAE/IESNA/ANSI 90.1-1999 ceases to be the Federal minimum standard next year. December 2010 will see our nation shift to the 2004 version of 90.1. This forces exterior application wattage restrictions into effect and reduces interior levels further. 28 states have already adopted the 2004 standard and they will likely be the first states to shift to the newest 2010 version of 90.1. The goal for 2010 is an overall additional reduction of 30% over the 2004 wattage limitations. Bi-level exterior dimming controls for efficiency will be mandated if the American Clean Energy and Security Act of 2009 passes as planned. By the time this goes to print you should know if the bill has passed and what the lumens per watt requirements for street and roadway fixtures (not already covered by 90.1) are. These changes require ongoing education for our industry.

Despite the strong state and federal emphasis on legislating outdoor lighting efficiency there is an issue of perception versus reality that is worth noting. Many of our utilities have difficulty providing enough electricity during peak demand times during the day. Most of our nation's electricity comes from coal and gas and the power plants cannot be shut down every night so that they are online to ramp up for peak demand during the day. There are no brownouts in the evening because the minimum levels utilities need to stay on generates excess power during nighttime. Last July, Senator Roderick Wright, CA spoke to this issue during a hearing on mandating an 80LPW minimum on exterior lighting fixtures (it was voted down). Senator Wright Chaired the Assembly Committee on Utilities and Commerce (U&C) which held legislative jurisdiction over electricity in California. He said that there is so much extra electricity generated in the evening in northern California that they have to pay Las Vegas to take the excess off the grid. He pointed out that more efficient fixtures at night would actually cost them more. Lowering wattage will save money for customers unless they are on a fixed rate like many municipalities. It will not lower carbon emissions or in most cases result in any savings for the utility. Eventually exterior lighting energy reductions may be necessary and significant. For now there are misconceptions and a counter intuitive situation that will keep educators busy.

Lighting events of seismic proportion can wreak destruction and will yield lasting change. Many of the topics discussed in this article have the potential to be seismic. Some companies will be blindsided and devastated by these shifts. Change is certain. The accelerated pace of significant change requires educators to be swift in developing new curriculum. These changes require continuous education to be able to position ourselves in the best location during these impending seismic events. Stay away from the epicenter.