



BENYA LIGHTING DESIGN

October 27, 2009

Fellow Lighting Professionals,

Last week at the IES meeting in Greensboro, I reported my concerns about LED outdoor lighting systems. To summarize my comments, I have been made aware of performance issues on at least two highly publicized outdoor lighting projects. One situation involved excessive lumen depreciation, the other involved premature failures. I also reported that at the ArchLED conference in Chicago, a panel reported excessive SSL product failures within 5 years, significantly less than the 50,000 to 100,000 hours that were promised.

Having been made aware of my comments, one prominent manufacturer of outdoor LED systems, wrote stating, “There seems to be a lot of misinformation and rumors floating around in the marketplace about (our product)....At this point we have no test data to verify any of the claims.... In regards to (one of the highly publicized projects) we have had nothing but very positive comments from the city and its residents. We have over 3000 successful installations in over 1000 cities around the world. It is hard to respond to applications where there is no solid information but just innuendoes. We are committed to producing the best possible product and seeing LED lighting gain acceptance in the lighting industry.”

But another prominent outdoor manufacturer wrote, “(We) did experience issues with the qualification of LED's for use in the product. During the product development cycle, (a major LED maker) made process changes in their LED fabrication related to the underfill process. As a result of these changes and (our) reliability testing, a latent infant mortality problem was identified with the LED that put the long-term reliability of the planned product in jeopardy. (Our) deep reliability testing ID'ed a problem or gap in (their) production device level testing and screening that allowed devices with the problem to sneak thru their production screening process. (The LED maker) made a global recall on the ... product as a precautionary measure and (we) decided that it was not advisable to proceed with product launch based on that component. As a result, we revised the design for (another major LED maker) component.... (The original maker) has subsequently rectified the problem and the (original LED) product has been reverified by (us) with the improved underfill process as a reliable component qualified for use in (our) product.”

These are comments from two competing LED outdoor lighting companies about their products manufactured **within the same time frame**. One made over 3000 installations and the other withheld product introduction pending resolution of a significant technical concern. I might also add, DOE Caliper tested an outdoor luminaire in 2008 and re-tested the same product in 2009, the second time using one obtained on the open market. The first one pulled 71 LPW, the second one only 54. This is a pretty big difference deserving more than a casual dismissal.

The point of my presentation, however, was not to vilify or criticize either manufacturer. Rather, I strongly recommended that specifiers provide extra due diligence when



considering an LED outdoor lighting system. I suggest obtaining the following data as minimum:

- Number of installed luminaires, when manufactured and installed
- What LED's and drivers
- Number of failures
- Measured initial light level (preferably >20 locations)
- Light level after one year
- Light level after two years
- Who took the measurements? What meter? When calibrated? Any certification of the measurements by an independent third party?

With regard to the color of the LED, I am part of the IDA Technical Committee that issued a press release expressing significant concern spectral power distribution. In summary, we believe that a number of sources, especially high CCT LED, have too much radiation at wavelengths less than 500 nm. These wavelengths correspond to the wavelengths that trigger the Circadian rhythm in humans and have similar effects on other flora and fauna. We also noted increased glare, especially in the aging part of the population. These were cited as adequate cause for concern, and we recommend using sources 3000K or lower in CCT as an interim measure until sufficient research can confirm that widespread use of these sources does not constitute an environmental hazard.

Our recommendation is founded in the precautionary principle. The **precautionary principle** is a moral and political principle which states that if an action or policy might cause severe or irreversible harm to the public or to the environment, in the absence of a scientific consensus that harm would not ensue, **the burden of proof falls on those who would advocate taking the action**. The principle implies that **there is a responsibility to intervene and protect the public** from exposure to harm where scientific investigation discovers a plausible risk in the course of having screened for other suspected causes. The protections that mitigate suspected risks can be relaxed only if further scientific findings emerge that more robustly support an alternative explanation. In some legal systems, as in the law of the European Union, the precautionary principle is also a general and compulsory principle of law¹. At IDA, we feel that the evidence is adequate to call the matter into question.

¹ Wikipedia