Where is the Revolution Headed?
by James Brodrick

The push-pull dynamic appears to be at work as SSL continues its march through the lighting marketplace.

It’s hard not to get caught up in the “SSL revolution” these days, particularly as you walk the aisles at LIGHTFAIR International here in Las Vegas. With so many LED lighting products coming onto the market, and their overall performance showing a steady improvement over time, it’s easy to forget that this is one revolution that’s far from over. Not only does solid-state lighting technology still have plenty of headroom left, but—despite the tremendous progress that’s already been made—in some respects we’ve barely skimmed the surface of what’s possible. That subject was a hot topic at DOE’s ninth annual Solid-State Lighting R&D Workshop, held in Atlanta earlier this year. We asked both speakers and attendees “Where is the revolution headed?”—and the answers were enlightening, to say the least.

INTEGRAL LUMINAIRES

Many of the discussions in Atlanta centered not only on where we stand in the SSL revolution, but on exploring the untapped possibilities. Along those lines, one speaker, Kevin Leadford of Acuity Brands Lighting, used the memorable phrase “vacuum tube mimicry” to describe the way many LED lighting products have been rotely patterned after traditional technologies. But he noted that some manufacturers have already started moving away from that paradigm and are instead allowing SSL’s unique characteristics and strengths to guide the design—just as the industry’s focus is beginning to shift toward integral luminaires rather than replacement lamps. Leadford emphasized that in order to take full advantage of SSL technology, we should completely rethink many of its aspects that we’ve taken for granted.

Josh Baribeau of Canaccord Genuity sounded a similar note when he said that in order for LEDs to fulfill their potential and truly revolutionize the lighting market rather than just penetrate it, the industry has to look beyond short-sighted solutions. He cited networking our lighting as a way to help optimize the generation and distribution of electricity and maximize the energy savings. Fred Maxik of Lighting Science Group took things a step further in predicting that a decade from now we’ll be using light in ways that we haven’t even imagined yet. He shared with the audience his personal vision that one day lights will comprise a complex communication network where sensors and controls join forces to maximize convenience and save energy, resulting in such features as road lights that brighten when a fire engine approaches and interior lights that react in a similar fashion when someone enters the building.

Sensors and controls are already finding use with a number of SSL applications, among which street lighting figures prominently. At the Atlanta workshop, Edward Smalley of Seattle City Light spoke about how his city has already converted 20,000 of its 84,000 streetlights to LED for an energy savings of 48 percent, and how they plan to test remote monitoring and adaptive controls in an effort to further increase those savings.

Brian Chemel of Digital Lumens was another speaker who emphasized the importance of intelligent lighting in the SSL revolution. He brought up not only the possibility of concentrating the intelligence in the fixture itself rather than in a centrally...
located controller, but also the idea that user preferences for lighting, as well as actual usage patterns, could be automatically discerned from historical data to help make lighting more efficient and dynamic.

MAKE ROOM FOR OLEDs

As futuristic as they may seem, OLEDs are also edging toward the brink of market-readiness, and several Atlanta speakers focused on the progress of their companies’ DOE-funded research in that direction. For example, Mike Weaver of Universal Display Corporation spoke of how he and his colleagues are working with Acuity Brands Lighting to make a phosphorescent OLED luminaire that, with a light output of 3,000-4,000 lumens, will not only be powerful enough for the commercial sector, but also efficient (>70 lumens per watt) and color-tunable (2,700K-4,000K). Those performance goals, he told the audience, are expected to be achieved this year.

Products like the one Weaver described show that, although the early years of the SSL revolution have been guided to a large extent by “technology’s push”—that is, a desire to fit SSL into preexisting applications—the emphasis has begun to shift more toward responding to an “application’s pull” and lighting spaces creatively, based on human needs. This approach will only make it easier to take full advantage of SSL’s capabilities and strengths—and, in the process, make a significant dent in our nation’s energy consumption.

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