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Taking the Lighting Revolution to a New Level

For years now, people have been talking about the "LED revolution" that's being fomented by the disruptive technology that is solid-state lighting. But at DOE's inaugural [Connected Lighting Systems Meeting](#), held last week in Portland, OR, it was more apparent than ever that the real revolution is only just now getting started. The growing recognition that SSL has the potential to transform the function of lighting from something relatively static and one-dimensional into something almost infinitely interactive and multifaceted has gained such momentum that there's no longer any possibility of turning back the tide.

Along with a growing cohort of industry stakeholders, DOE recognizes the potential that connected lighting holds to impact its mission, which is greater lighting energy savings. As a result, we decided to organize a meeting focused on accelerating the development of connected-lighting technology — a meeting that, to our knowledge, is the first and only one of its kind. We brought together lighting technologists, their counterparts from the semiconductor and IT industries, folks from utilities, and many others to start a cross-cutting dialogue about how best to take advantage of the imminent collision between lighting systems and the fast-emerging Internet of Things (IoT).

The timeliness of such a meeting was evidenced by the electric atmosphere and the intense expressions on the faces of the more than 260 participants — who were crammed into every seat in the auditorium, and who craned forward throughout the entire day so as not to miss a word of what was being said by speakers representing such players as Cisco, Intel, Google, and Microsoft. But as informative as the formal presentations were, they were only the beginning, with conversations continuing during spirited — and often edgy — Q&A sessions and hallway conversations. This gathering was less about cross-stakeholder education than it was about stimulating everyone there and causing them to question previously held positions and unexamined assumptions.

DOE's main interest in all of this, of course, is in making sure that energy efficiency — which could be significantly increased by providing intelligent SSL devices with data that enables them to optimize their performance — doesn't get lost amid all of the other services and benefits connected lighting is poised to bring. Those benefits are considerable and range from improving health,

well-being, and productivity by tuning the spectrum; to optimizing office and warehouse space by analyzing usage patterns; to enhancing the shopping experience in retail stores; to providing the very pathway through which a wide range of devices can exchange useable and useful data.

That latter possibility — i.e., that lighting systems may become an IoT backbone, or even the main IoT backbone, for buildings and cities — is bolstered by three key factors: SSL's microelectronic nature, which readily facilitates the integration of network interfaces and sensors; the growing integration of SSL devices into the built environment, often justified solely on the basis of energy savings; and the fact that lighting is ubiquitous infrastructure that can be found pretty much everywhere people congregate.

A big problem, of course, is agreeing on common platforms and protocols that facilitate the transfer of useable data among lighting devices, other systems, and the cloud; indeed, this was one of the hot topics at the Portland meeting. In his keynote address, Tom Herbst of Cisco noted that right now, it's "kind of a land grab or Wild West," with a number of groups working to establish some order. A panel on interoperability featured representatives from several of those groups: the ZigBee Alliance, the AllSeen Alliance, oneM2M, and the Open Interconnect Consortium. Hearing them describe the work they're doing, one couldn't help being struck by how well these IT folks have learned to simultaneously compete and collaborate — something that all connected-lighting stakeholders will likely need to emulate in order to harness its potential.

As for what other characteristics are required to realize the full potential of connected lighting, a common theme in Portland was that you don't have to get it perfect, and that it's not necessary to figure out in advance all of the applications it will support. Rather, all that's needed is to bring about something "good enough": a platform built using interoperable protocols that will enable the development and delivery of applications and services in due course — just as happened with smartphones, for example.

One class of applications and services that might be developed would leverage the availability of energy data. Michael Poplawski of Pacific Northwest National Laboratory kicked off a panel on the topic by noting that "you can't effectively manage what you can't measure" and suggesting that energy data should not be looked at as of interest solely to DOE. Data-driven energy management, pay-for-performance energy efficiency program incentives, more attractive ESCO business models, and transactive energy markets can all be enabled by lighting systems that can report their own energy consumption.

The seemingly infinite and multifaced potential of connected lighting won't be realized, however, if the products are too difficult to install, set up, and commission. Managing configuration complexity was the subject of a lively panel discussion that featured Dagnachew Birru of Philips Lighting and Kishore

Manghnani of Orama talking about self-configuration, and Tom Griffiths of AMS-TAOS reviewing the role chip-scale integrated sensors combined with local intelligence can play.

To accomplish all of this, it's essential that we not only remain open to new value streams, but that we also figure out where and how to collaborate, and not waste time reinventing the wheel. Last week's meeting in Portland represented key steps toward that collaboration. Twenty years ago, few suspected that voice communication would one day be overshadowed by the myriad other capabilities of today's smartphones. Lighting may well be headed for a similar fate — so hang on and stay tuned.

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.