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U.S. DEPARTMENT OF ENERGY

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Webinar Series on DOE Sky Glow Investigation

Public concerns continue to swirl around the higher levels of short-wavelength ("blue") light emitted by the LED sources that are rapidly replacing incumbent technology in exterior lighting applications, particularly street lighting. Such concerns range from potential biological and health impacts that can result from the increased presence of such wavelengths at unnatural times in the diurnal cycle, to potential increases in anthropogenic "sky glow" that disrupt the visibility of the night sky.

Among the resources DOE has created to address the topic is an extensive investigation conducted to better understand the potential impacts of LED street lighting on sky glow compared to traditional high-pressure sodium (HPS) lighting. That investigation used sophisticated modeling techniques to quantify an estimate "from the ground up," taking into account several key factors that influence sky glow. The study's report, *An Investigation of LED Street Lighting's Impact on Sky Glow*, was recently published and has been attracting considerable attention.

DOE is hosting two upcoming webinars to present and discuss the results of that study. Both webinars will start at 12:00 p.m. Eastern Time (9:00 a.m. Pacific Time) and last one hour. Each webinar will feature a presentation followed by a live Q&A session, where attendees can submit questions that will be answered as time allows:

- **Thursday, July 20** – "The Impact of LED Street Lighting on Sky Glow." Presenter Bruce Kinzey of Pacific Northwest National Laboratory (PNNL) will provide a high-level overview of the study and its findings, to put them into a context of "typical" street lighting conversions taking place in the U.S. today. Register for the July 20 webinar.

- **Thursday, July 27** – "A Technical Discussion of DOE's Sky Glow Study, Modeling Methods, and Key Variables." In this follow-on webinar, presenter Tess Perrin of PNNL will provide a deeper dive into the modeling effort as well as the influence of individual variables. Register for the July 27 webinar.

In the study, careful attention was given to characteristics of the lighting sources employed (including distribution, output, and spectral content), along with other factors (such as atmospheric conditions) that influence the characteristics of scattered light in the night sky. One major finding is that all of the modeled LED product conversions, which were carefully selected to represent typical conversion scenarios in the U.S., reduce sky glow relative to an HPS baseline, when the results are expressed as unweighted radiant power, for both the near and distant observers. When the results are instead scotopically weighted to evaluate the effects on human vision, some LED products reduce sky glow for the near observer compared to the baseline, and others increase it, depending on their relative content of shorter wavelengths. However, CCT was found to be an unreliable predictor of sky glow impacts, especially when the results are not scotopically weighted.

In addition, for distant observers, the uplight elimination that occurs in typical LED conversions nearly removes the contribution to sky glow from the street lighting system, for both the unweighted and scotopically weighted results, for all LED spectral power distributions and atmospheric conditions. For residents living near the city, results indicate that the visible contribution to sky glow from a typical streetlight conversion is likely to be no worse than with the system that was replaced, and may even have improved.

I invite you to attend these informative webinars. For more information or to register, visit the DOE website.

Best regards,
Jim Brodrick

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