2022 DOE Solid-State Lighting Workshop

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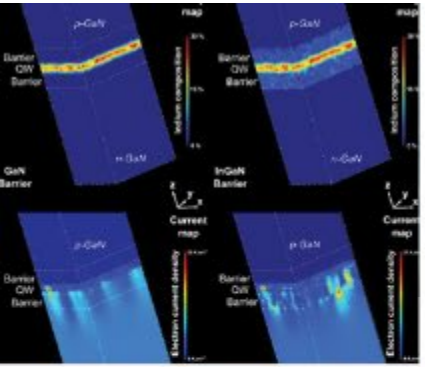
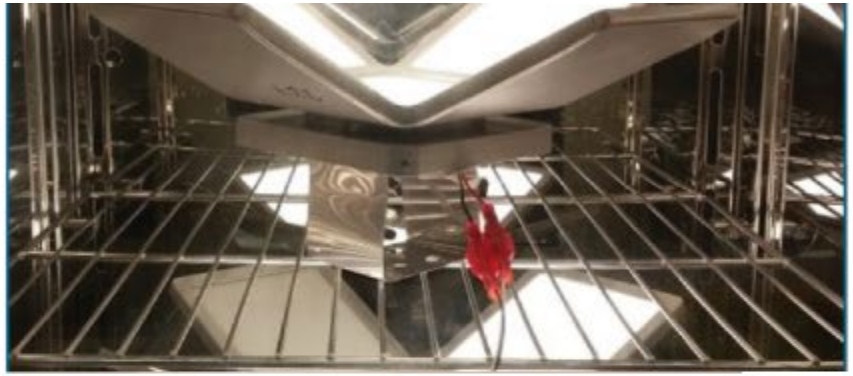
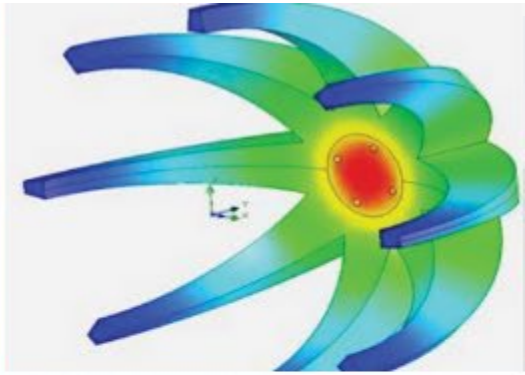
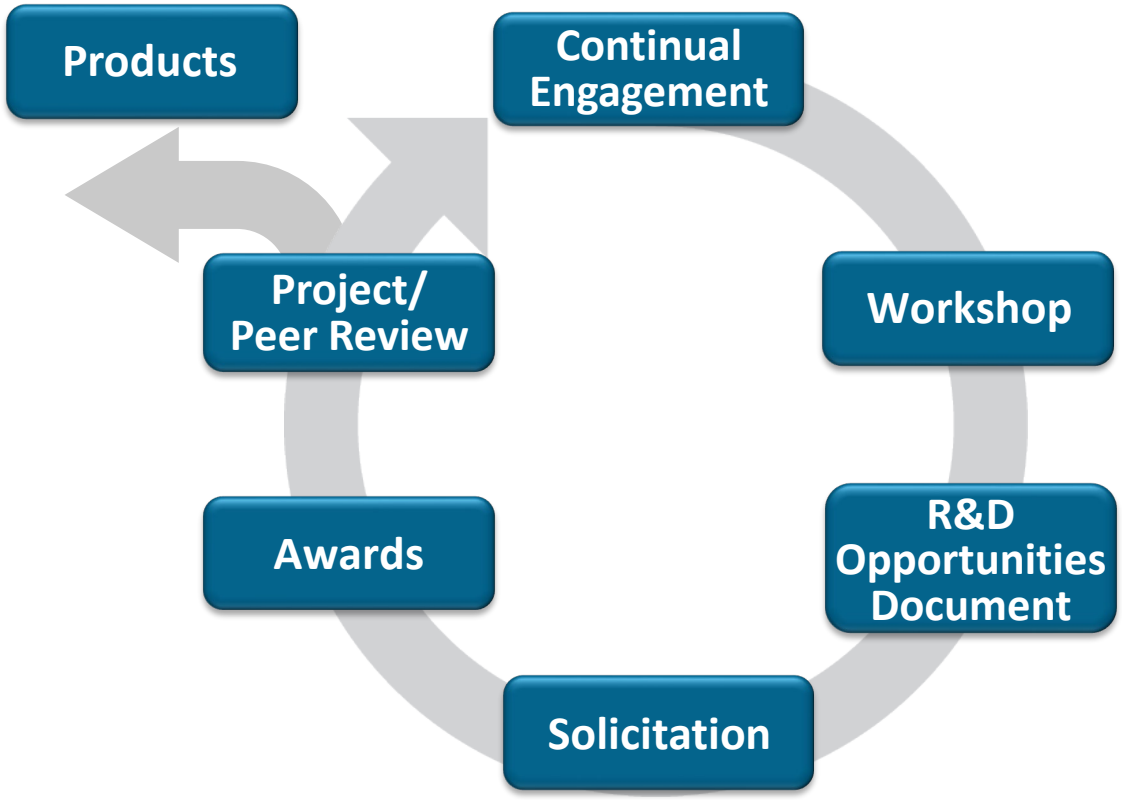
January 31, 2022




DOE's planning process offers many opportunities to engage

SSL community input from workshops and small topical meetings shape R&D priorities and DOE solicitations



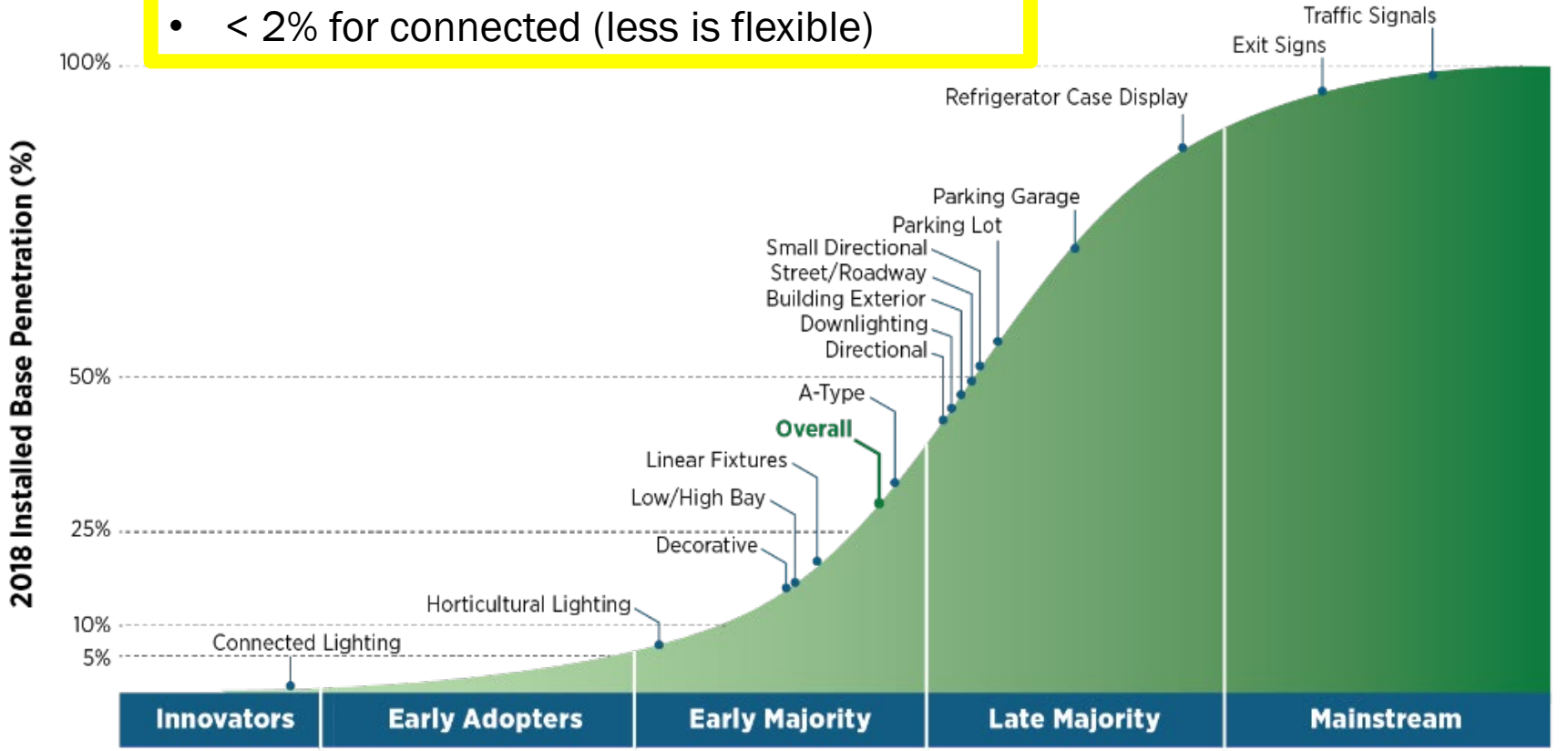
DOE targets push industry to levels of efficacy and performance that might not otherwise be achieved.

Analysis of emerging products prompts improvements, informs R&D priorities.

Technology pipeline shows progress and potential

The adoption of LED lighting is progressing, but there is still significant head room in many segments.

LED adoption:
- < 50% overall (incl. bulbs)
- < 25% for linear
- < 2% for connected (less is flexible)



Solid-state lighting: high impact everywhere you look

347
Projects

458
Patents

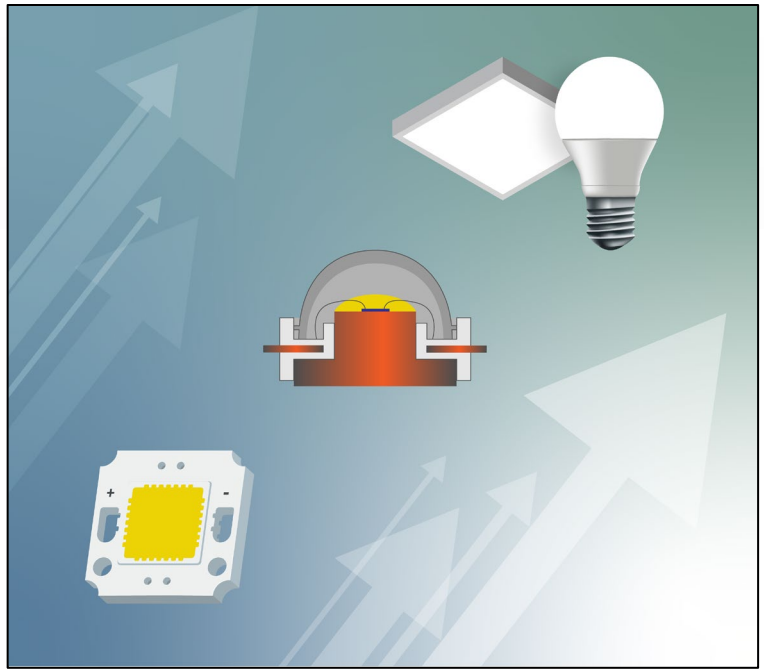
357
Products

185
billion kWh saved per year

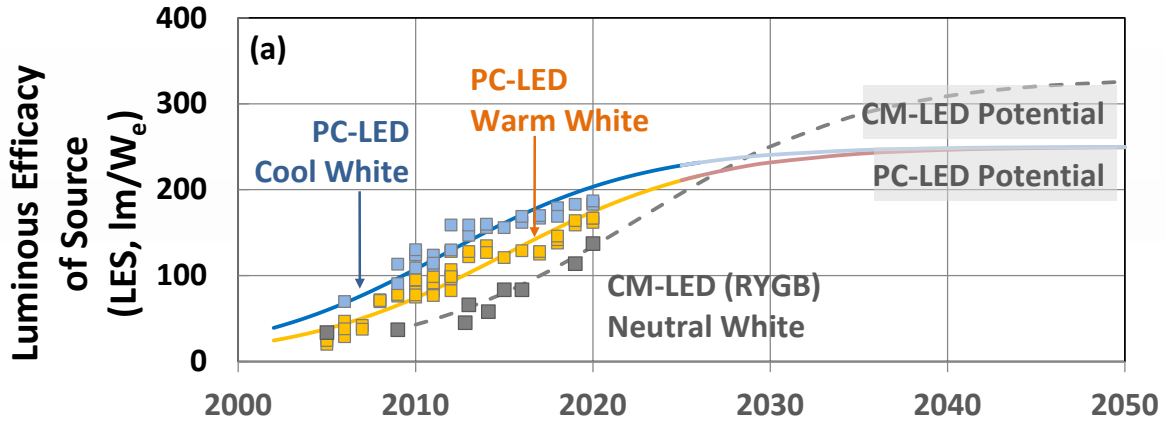
79 million metric tons of CO_2 saved per year

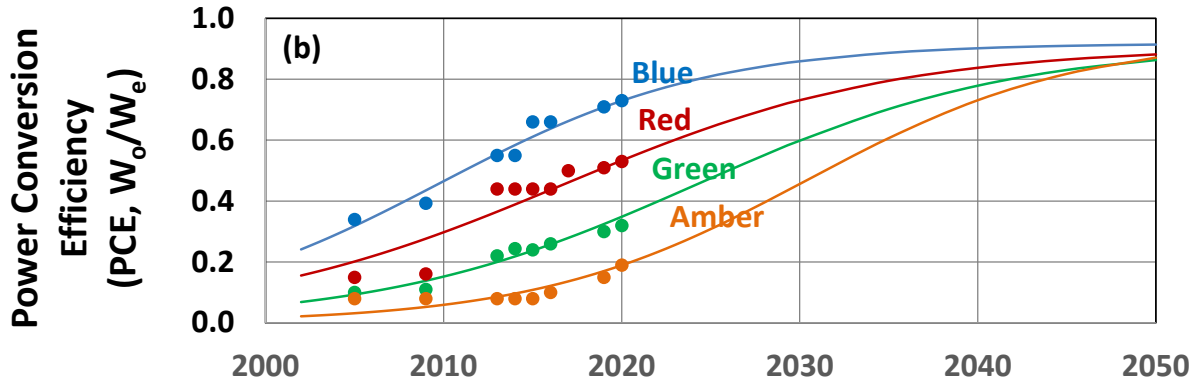
$20 billion in energy costs avoided per year

Improving SSL source efficacy has always been a priority



- Develop new or improved materials with an advanced fundamental understanding of materials-device-synthesis relationships
- Designing for performance at different operating regimes (temperature, current density, luminance, SPD requirements)



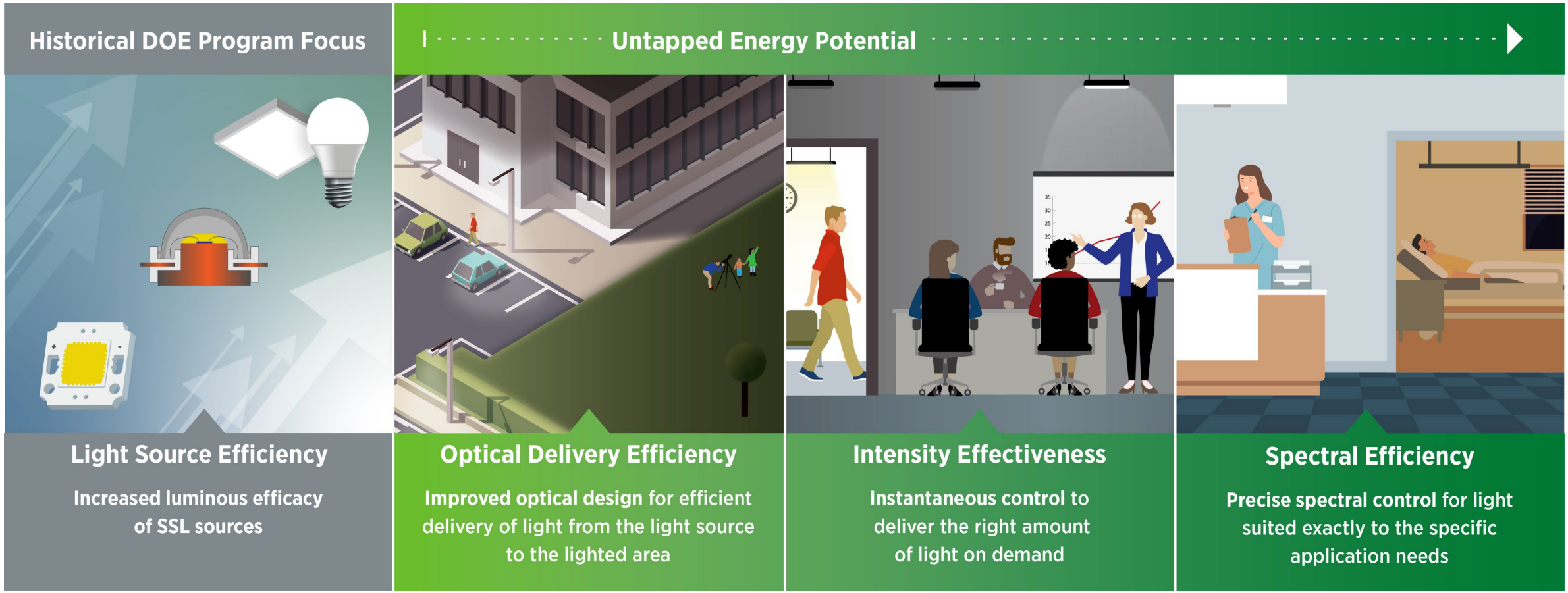


Source: 2022 Solid-State Lighting R&D Opportunities

The Lighting Application Efficiency opportunity: broad & early days

Lighting application efficiency describes

- Effective generation of
- optimized light;
- delivery to the right location
- at the right time



Solid State Lighting focuses on three priority areas

Lighting R&D Goals

Efficient and flexible lighting that supports health, productivity, and well-being

Platform Technology

Lighting Science

Integration & Validation

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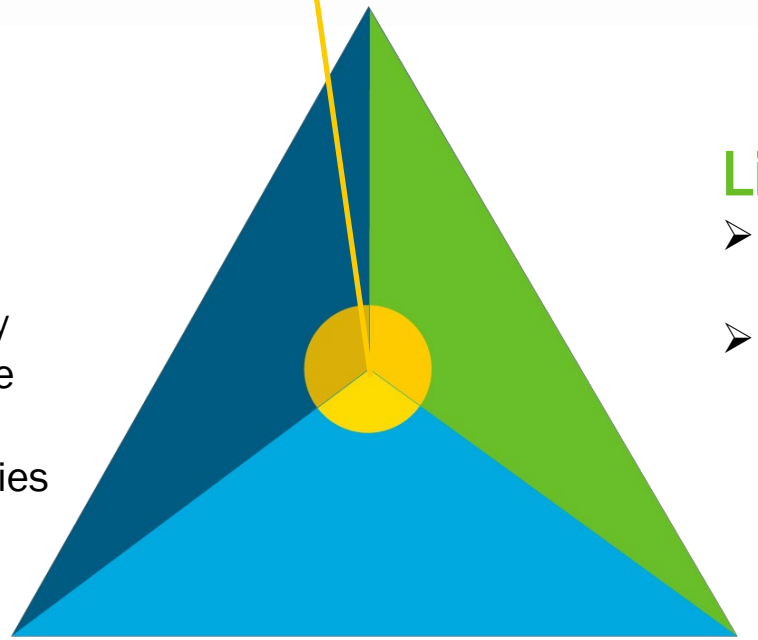

Platform Technology

- Lower barriers to adoption, decrease performance trade-offs
- Improve lighting application efficiency through advances in materials, device structures, components, capabilities, integration, manufacturing technologies

Lighting Science

- Inform lighting application efficiency and carbon efficiency
- Understand how best to apply new capabilities enabled by LED lighting

Integration & Validation

- Provide reliable information and understand barriers to adoption of advanced lighting
- Demonstrate performance and related benefits in realistic lighting settings

Emerging Topics

Next Generation Lighting Professionals

- February 1 at 11:00 a.m. ET

Innovations in Display Architecture for Improved Energy Efficiency and Performance

- February 2 at 3:30 p.m. ET

Disinfection: What Have We Learned About GUV and Other Methods?

- February 2 at 3:30 p.m. ET

Building Scale Systems Interoperability and Integration

- February 3 at 1:30 p.m. ET

Student Poster Competition

Student Poster Competition Honorable Mention

Learn more about their work in the Poster Forum

Sangjun Jeong
Texas A&M University
Far-red light and temperature interactively affect plant morphology, yield, and light use efficiency in indoor lettuce and basil production

Chen Mo
Penn State University
Sidewall passivation for micro-LEDs

Akila Udage
Rensselaer Polytechnic University
Evaluation of 3D printed antenna performance for lighting fixtures

Student Poster Competition Grand Prize Winners

Learn more about their work in the Poster Forum

Shruti Hariyani
University of Houston
Advancing human-centric lighting

Hannah Moon
University of Hawai'i at Mānoa
Using electroretinograms to characterize the retinal response of endangered Hawaiian seabirds to different light spectra

JOIN US

February 3 at
11:00 a.m. ET

U.S. Secretary of Energy
Jennifer Granholm
will announce Concept Phase Winners!

DOE's Solid-State Lighting work is based on partnership

Key DOE Roles

CONVENE

DOE topical meetings and workshops bring innovators together to identify priority challenges

PLAN

Based on those priorities DOE sets technology milestones and creates an annual SSL R&D Opportunities document

CO-FUND

DOE funds competitively awarded and cost-shared projects aligned with the plan

SHARE

DOE ensures open information flow and provides analyses that spur technology advances and inform future R&D priorities

U.S. Department of Energy

SOLID-STATE LIGHTING WORKSHOP

Cosponsored by the Illuminating Engineering Society

U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

IES Illuminating ENGINEERING SOCIETY