Solid-State Lighting Recovery Act Award Selections

Core Technology Research Projects

Award Winners	City and State	Zip Code	Project Description	DOE Funding	Total Project Value
Cambrios	Sunnyvale, CA	94085-4520	**Solution-Processable Transparent Conductive Hole Injection Electrode for Organic Light-Emitting Diode (OLED) SSL.** This project seeks to develop a cost-effective replacement for indium tin oxide for use as an electrode in OLED lighting devices. Indium is both rare and very expensive.	$1,199,971	$1,846,110
University of Rochester	Rochester, NY	14627-0216	**Development and Utilization of Host Materials for White Phosphorescent OLEDs.** This project seeks to produce white OLEDs with > 100 lm/W efficiency after light extraction enhancement and > 10,000 hour operating time, by making a new class of emissive materials.	$1,239,071	$1,376,746
WhiteOptics, LLC	Newark, DE	19713-3448	**Low-Cost, Highly Lambertian Reflector Composite for Improved LED Fixture Efficiency and Lifetime.** This project seeks to demonstrate a highly reflective, highly diffuse, low-cost composite material that is able to withstand at least 50,000 hours of luminaire operation.	$1,556,316	$1,967,373

Product Development Projects

Award Winners	City and State	Zip Code	Project Description	Total DOE Funding	Total Project Value
Cree, Inc.	Durham, NC	27703-8475	**Ultra-Compact High-Efficiency Luminaire for General Illumination.** This project seeks to create an ultra-compact 80-lm/W SSL luminaire that emits at a color temperature of 3000K with a CRI of 90. The integrated approach will establish a technology platform capable of providing high-efficiency LED components that can be adopted across a variety of SSL applications.	$1,799,962	$2,337,613
General Electric	Niskayuna, NY	12309-1027	**Optimized Phosphors for Warm-White LED Light Engines.** GE Global Research, in collaboration with GE Lumination and the University of Georgia (UGA), seeks to develop optimized phosphor systems and packaging for LED down-conversion.	$1,774,565	$2,535,095
Lightscape Materials, Inc.	Princeton, NJ	08540-6449	**Nitride- and Oxynitride-Based Phosphors for SSL.** This project seeks to develop a set of high-efficiency, novel nitride- and oxynitride-based phosphor products.	$1,794,806	$2,243,507
Osram Sylvania Products, Inc.	Beverly, MA	01915-1068	**High-Flux Commercial Illumination Solution with Intelligent Controls.** This project seeks to create a replacement solution for fluorescent luminaires that consists of intelligent control electronics, three linear LED modules using remote phosphor technology, and a power supply, all enclosed in a metal housing. The intelligent controls will sense occupancy and ambient lighting conditions and then, to gain additional energy savings, will use switching and dimming that's not possible without degrading fluorescent lamp performance.	$1,439,794	$1,799,742
Philips Lumileds Lighting Company, LLC	San Jose, CA	95131-1008	**130 Lm/W, 1000 Lm Warm-White LED for Illumination.** This project seeks to develop an illumination-grade LED having a warm-white color range, comparable output to a 75 watt incandescent lamp, and an efficacy of 130 lm/W.	$1,837,168	$2,296,460

PPG Industries	Cheswick, PA	15024-9464	**Low-Cost Integrated Substrate for OLED Lighting.** PPG Industries, Inc., Glass R&D plans to develop a new low-cost integrated substrate product that is suitable for OLED lighting manufacture and is compatible with PPG's existing flat-glass and transparent-glass coating technologies and high-volume glass manufacturing methods.	$1,672,090	$2,140,062
Solid-State Lighting Manufacturing Projects					
Award Winners	**City and State**	**Zip Code**	**Project Description**	**Total DOE Funding**	**Total Project Value**
Applied Materials, Inc.	Santa Clara, CA	95054-8039	**Advanced Epi Tools for Gallium Nitride LED Devices.** This project seeks to develop an advanced multichamber hybrid epitaxial growth system for LED manufacturers that has the potential to decrease operating costs, increase efficiency of LEDs, and improve binning yields.	$3,993,911	$8,718,911
GE Global Research	Niskayuna, NY	12309-1027	**Roll-to-Roll Solution-Processable Small-Molecule OLEDs.** This project seeks to upgrade GE's prepilot OLED roll-to-roll manufacturing line through improved high-performance phosphorescent small-molecule OLED materials, advanced OLED device architectures, plastic ultra-high barrier films, and an advanced encapsulation scheme.	$3,999,966	$7,999,932
GE Lumination	Valley View, OH	44125-4635	**Development of Advanced Manufacturing Methods for Warm-White LEDs for General Lighting.** This project seeks to develop precise and efficient manufacturing techniques for GE Lumination's "remote phosphor" platform of warm-white LED products named Vio™. The approach drives significant materials, labor, and capital productivity to achieve approximately 53% reduction in overall cost, while minimizing color variation in the Vio platform.	$772,425	$1,544,850
KLA-Tencor Corporation	Milpitas, CA	95035-1809	**Automated Yield Management and Defect Source Analysis Inspection Tooling and Software for LED Manufacturing.** This project seeks to improve the product yield for high-brightness LEDs by developing an automated optical defect detection and classification system that identifies and distinguishes harmful defects from benign defects. The proposed approach allows for traceability in defect origin and includes the hardware and correlated software package development.	$3,484,045	$6,968,091
Philips Lumileds Lighting Company, LLC	San Jose, CA	95131-1008	**Low-Cost Illumination-Grade LEDs.** This project seeks to realize a 30% yield improvement and 60% reduction in epitaxy manufacturing costs for high-power LEDs through the implementation of silicon-based epitaxial processes on large-diameter substrates. The use of silicon replaces the industry-standard sapphire or silicon-carbide substrates. The process will be developed using Philips Lumileds's proven LUXEON® Rebel LED.	$1,907,963	$3,815,926
Ultratech, Inc.	San Jose, CA	95134-2126	**A Low-Cost Lithography Tool for High-Brightness LED Manufacturing.** This project seeks to develop a lithographic manufacturing tool having the benefits of higher throughput, greater yields, lower initial capital cost, and lower cost of ownership. A projection stepper process will be modified and optimized for LED manufacturing. The proposed system will be able to accommodate a variety of wafer sizes and thicknesses and handle the wafer warpage typically associated with larger-diameter substrates.	$1,295,634	$2,364,327

Universal Display Corporation (UDC)	Ewing, NJ	08618-1428	**Creation of a U.S. Phosphorescent OLED Lighting Panel Manufacturing Facility.** This project seeks to design and set up two pilot phosphorescent OLED (PHOLED) manufacturing lines. The team will implement UDC's PHOLED technology and provide prototype lighting panels to U.S. luminaire manufacturers to incorporate into products, to facilitate testing of design, and to gauge customer acceptance.	$4,000,000	$8,304,470
Veeco Instruments	Somerset, NJ	08873-5118	**Implementation of Process-Simulation Tools and Temperature-Control Methods for High-Yield Metal Organic Chemical Vapor Deposition (MOCVD) Growth.** This project seeks to develop a complementary set of high-resolution short-wavelength and infra-red in-situ monitoring tools for accurate substrate temperature measurement and growth rate monitoring. Philips Lumileds will test the resulting tool in the processing of LEDs. The approach is anticipated to result in a 100% improvement in wavelength yield and a 75% cost reduction for LED epitaxy.	$4,000,000	$8,000,000