A Broader Look at Government SSL Support

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DOE Support for SSL R&D

- DOE’s SSL Program guides many related government-supported SSL R&D efforts
- Collaboration, coordination create a bridge between related efforts

- SSL Program R&D, Market Development Support
- Small Business Innovation Research (SBIR) Program
- Energy Frontier Research Centers (EFRCs)
- Advanced Research Projects Agency-Energy (ARPA-E)
- Advanced Manufacturing Office (AMO)
SSL Program Elements

SSL PARTNERSHIPS
- NGLIA
- IES
- IEA
- IALD
- MUNICIPAL CONSORTIUM

RESEARCH & DEVELOPMENT
- Core Technology Research
- Product Development
- Manufacturing

TESTING & PRODUCT DEVELOPMENT
- CALIPER
- LED Lighting Facts®
- Standards Development Support
- GATEWAY Demonstrations
- Next Generation Luminaires™
- L Prize®

MARKET DEVELOPMENT
- Utilities
- Energy Efficiency Programs
- Municipalities
- Manufacturers
- Designers
- Specifiers
- Retailers
- Distributors

COMMUNICATIONS & PLANNING

Market-Ready Energy-Efficient Products
Core Technology Research

- Applied research to fill SSL technology gaps, provide enabling knowledge or data
- Particular emphasis on meeting technical targets for performance and cost
- Funded by Office of Energy Efficiency and Renewable Energy, SSL Program
- Guided by Multi-Year Plan priorities and targets

www.ssl.energy.gov/projects.html
Look for these posters:

- Poster 2: Development and Utilization of Host Materials for White Phosphorescent OLEDs (University of Rochester)
- Poster 5: Light Extraction of OLEDs using Lens Arrays (University of Florida)
- Poster 6: High Efficiency and Stable White OLED using a Single Emitter (Arizona State University)
- Poster 8: Low-Cost, Highly Lambertian Reflector Composite for Improved LED Fixture Efficiency and Lifetime (WhiteOptics)
- Poster 9: Lattice Mismatched GaInP Alloys for Color Mixing White Light LEDs (National Renewable Energy Laboratory)
- Poster 11: Phosphors for Near UV-Emitting LEDs for Efficacious Generation of White Light (University of California-San Diego)
Core Technology Research

Look for these posters:

- Poster 15: Semi-polar GaN Materials Technology for High IQE Green LEDs (Sandia National Laboratories)
- Poster 16: System Reliability Model for SSL Luminaires (RTI International)
- Poster 17: High Efficiency Colloidal Quantum Dot Phosphors (University at Buffalo/SUNY)
- Poster 18: LEDs on Semipolar Bulk GaN Substrate (Soraa)
- Poster 29: Development of High Efficiency m-Plane LEDs on Low Defect Density Bulk GaN Substrates (Soraa)
- Poster 32: High Efficacy Green LEDs by Polarization Controlled MOVPE (Rensselaer Polytechnic Institute)

www.ssl.energy.gov/projects.html
Product Development

- Use of applied research to develop or improve commercially viable SSL materials, devices, or systems
- Focus on a targeted market application with fully defined price, efficacy, and other performance parameters
- Funded by Office of Energy Efficiency and Renewable Energy/SSL Program
- Guided by Multi-Year Plan priorities and targets

www.ssl.energy.gov/projects.html
Look for these posters:

- Poster 7: Low Cost Integrated Substrate for OLED Lighting Development (PPG Industries)
- Poster 13: High Efficiency Integrated Package (Cree)
- Poster 24: High Efficiency Driving Electronics for General Illumination LED Luminaires (Philips Lighting)
- Poster 31: High Power Warm White Hybrid LED Package for Illumination (Philips Lumileds Lighting)
Manufacturing R&D

- R&D to achieve cost reductions through improvements in manufacturing, while maintaining or enhancing performance
- Focus on significant leaps in SSL manufacturing equipment, processes, or monitoring techniques, and on fostering U.S.-based manufacturing
- Funded by Office of Energy Efficiency and Renewable Energy/SSL Program
- Guided by Manufacturing R&D Roadmap
- Focus of separate workshop, June 5–6 in Boston
Market Development Support

- Strategic efforts designed to overcome barriers to market adoption
- Closely coordinated with R&D progress to ensure appropriate applications, avoid buyer dissatisfaction
- Funded by Office of Energy Efficiency and Renewable Energy, SSL Program
- Guided by Market Development Support Plan
- Focus on separate workshop, November 12–14 in Portland
- Testing, demonstrations, and analysis expand our knowledge base

www.ssl.energy.gov/market.html
Market Development Support

• Studies and reports present objective market and technical analysis
  – Next up: DOE’s Environmental Impacts study

• Design competitions drive innovation, draw attention to well-designed products
  – Check out the L Prize® and Next Generation Luminaires™ exhibits

• Workshops, roundtables, working groups identify needs, address critical issues
  – Reliability Consortium and RTI efforts, see Poster 16
  – Exhibits on Dimming, Color, and Equivalency

• Look for these posters:
  – Poster 26: DOE Environmental Impacts Study (PNNL)
  – Poster 28: Spectrally Enhanced Lighting (The Lighting Partnership)
Small Business Innovation Research

- Annual solicitations increase participation of small businesses in federal R&D, include topics related to SSL
- Funded by DOE Office of Science, Basic Energy Sciences Program
- Research topics identified by EERE/SSL, grants managed by EERE/SSL

Look for these posters:
- Poster 1: Enhanced Light Extraction in OLED Devices (Sinmat)
- Posters 10, 12, 19: Solutions for OLED Lighting (Universal Display Corporation)
- Poster 21: Dielectric Printed Circuit Board Planar Thermosyphon (Advanced Cooling Technologies)
- Poster 23: CarbAl™ Based Circuit Board for Power LED Packaging (Applied Nanotech)

http://science.energy.gov/sbir
Energy Frontier Research Centers

- Support fundamental, longer horizon energy research
- EFRCs with SSL R&D include: USBC, USC, Sandia, CalTech, Carnegie Institution of Washington, MIT
- Funded by DOE Office of Science, Basic Energy Sciences Program
- 2011 EERE/SSL and OS/BES Roundtable on science challenges

Look for these posters:

- Poster 3: Excited State Interactions in High Intensity OLEDs (University of Michigan)
- Poster 30: Nanostructure InGaN/GaN LEDs (University of Southern California)

[Link](http://science.energy.gov/bes/efrc)
Advanced Research Projects Agency — Energy (ARPA-E)

- Supports high-potential energy-related R&D considered “too early” for private investment
- Includes topics related to SSL

Look for these posters:
- Poster 14: Chip Scale Power Converters for LED Lighting (Teledyne)
- Poster 20: Advanced Power Electronics for LED Drivers (Dartmouth College)
- Poster 22: Metacapacitors for LED Lighting (CUNY Energy Institute)
- Poster 25: Ammonothermal Bulk GaN Crystal Growth for Energy Efficient Lighting (Soraa)

http://arpa-e.energy.gov
• Invests in innovative technology, shared infrastructure and facilities, and education and workforce development in support of the President's Advanced Manufacturing Partnership

• Innovative Manufacturing Initiative focuses on development of transformational manufacturing technologies

• SSL-related project is partially funded by EERE/SSL, builds on prior EERE/SSL project

Look for Poster 27:
– Production of Bulk GaN Substrates by Electrochemical Solution Growth Method (Sandia National Laboratories)
DOE SSL Program Provides National Leadership

- SSL Program is a collaborative, cooperative partnership — with the lighting industry, research community, national labs, and market sector partners
- DOE Multi-Year Plan provides guidance
  - For various DOE efforts
  - For U.S. and global efforts
- This is your opportunity to participate
  - More on this from Fred Welsh
- Sign up for regular updates on SSL Program activities

www.ssl.energy.gov