SOLID-STATE LIGHTING:

Guiding Technology from Laboratory to Marketplace

The U.S. Department of Energy's (DOE) solid-state lighting (SSL) portfolio builds collaborative efforts with the lighting industry and research community to guide energy-efficient SSL technology from laboratory to marketplace.

DOE's investments in solid-state lighting are designed to accelerate the progress of high-quality, energy-efficient technologies into general lighting markets. The LED recessed accent lights in the installation shown here were recognized in the SSL Next Generation Luminaires™ competition.

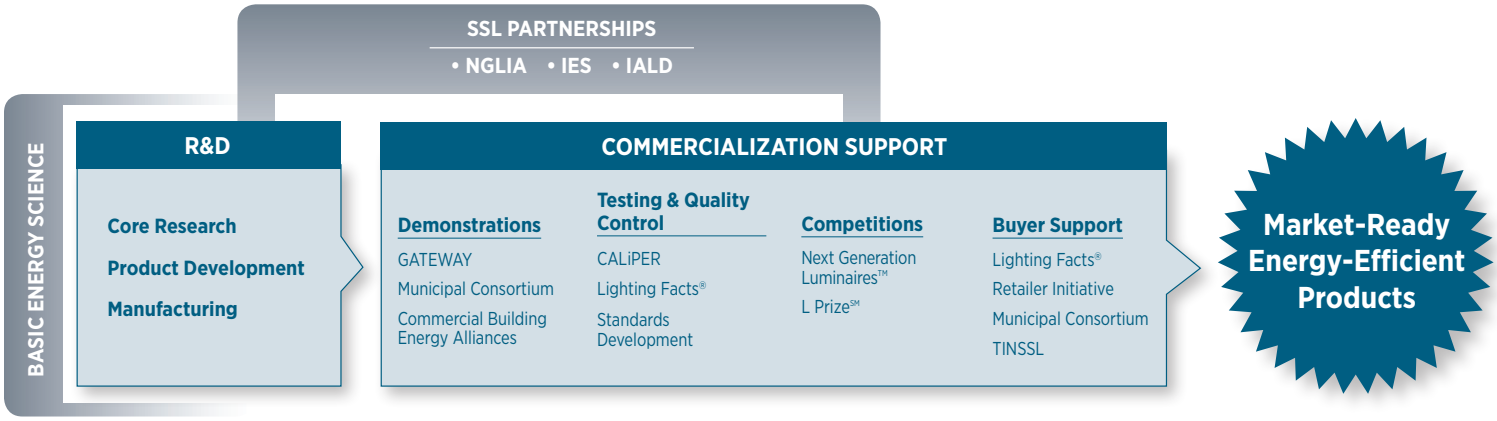
DOE and its partners are working to advance SSL technology through a comprehensive strategy encompassing research and development (R&D) and commercialization support activities. Ultimately, these efforts seek to accelerate development and market adoption of cost-competitive products that deliver the greatest possible energy-saving results for the nation.

Partner organizations that are instrumental in shaping the program portfolio include the Next Generation Lighting Industry Alliance (NGLIA), which provides technical and market-status input to DOE; the Illuminating Engineering Society of North America (IES), a partner in developing SSL lighting standards; and the International Association of Lighting Designers (IALD), which promotes lighting design principles and technologies that improve lighting quality and energy efficiency.

Research and Development

DOE investments in SSL R&D span the spectrum from basic research, through core technology research, to product development and manufacturing research. www.ssl.energy.gov/projects.html

- **Basic research** projects, conducted under the auspices of DOE's Basic Energy Sciences program, address scientific questions that underlie DOE mission needs. They target principles of physics, chemistry, and the materials sciences, including knowledge of electronic and optical processes that enable development of new synthesis techniques and novel materials.
- **Core technology research** projects focus on applied research for technology development, with particular emphasis on meeting efficiency, performance, and cost targets. Conducted primarily by academia, national laboratories, and research institutions, this scientific research fills technology gaps, provides enabling data, and significantly advances the knowledge base.
- **Product development** projects use the knowledge gained from basic or applied research to develop or improve



commercially viable materials, devices, or systems. Conducted primarily by industry, technical activities focus on a targeted market application with fully defined price, efficacy, and other performance parameters necessary for the success of the proposed product.

- **Manufacturing R&D** projects seek to reduce costs and enhance quality in SSL products, addressing the technical challenges that must be overcome to enable SSL to compete with existing lighting on a first-cost basis. Focus is on significant leaps forward in manufacturing equipment, processes, or monitoring techniques, and on fostering U.S. leadership in SSL manufacturing.

Commercialization Support

To ensure that R&D investments lead to SSL marketplace success, DOE has drawn on its ongoing relationships with the SSL industry and research community to develop and implement appropriate commercialization support strategies. www.ssl.energy.gov/market.html

- **Demonstrations** showcase and verify the real-world performance of SSL products and systems in a wide range of emerging applications. They are accomplished through DOE's GATEWAY demonstration program, Municipal Solid-State Street Lighting Consortium, and the Commercial Building Energy Alliances.
- **Testing and quality control** efforts include the CALiPER program, which tests the performance of SSL products available on the market, comparing them with similar products using traditional light sources; and standards development, which provides the new test procedures and industry standards needed to measure SSL lighting performance. DOE provides national leadership for this effort, working closely with IES, the National Electrical Manufacturers Association (NEMA), NGLIA, the American National Standards Institute (ANSI), and other organizations to accelerate the standards development process.
- **Competitions** publicize SSL products that meet demanding quality and performance criteria. Competitions include the Next Generation Luminaires™ design competition, which annually recognizes excellence in the design of energy-efficient LED commercial lighting luminaires; and the L Prize℠, which aims to accelerate development and adoption of SSL products to replace two of today's most widely used and inefficient products: 60W incandescent lamps and PAR 38 halogen lamps.
- **Buyer support** activities include Lighting Facts®, a voluntary product labeling program that provides consumers with clear information on SSL product performance based on established industry tests. Through the Retailer Initiative, Lighting Facts retail partners are working with manufacturer partners to educate the public on how to evaluate SSL products. Municipal Consortium resources help cities evaluate LED street lighting products, while the DOE Technical Information Network for SSL (TINSSL) focuses on education and information for utility and energy efficiency program sponsors.

Together, these strategies facilitate informed decision-making by lighting designers and other consumers, helping to ensure that SSL products perform to expectations and find successful applications in general illumination markets.

For More Information

For more information on the DOE SSL program, see www.ssl.energy.gov.

EERE Information Center

1-877-EERE-INFO (1-877-337-3463)
www.eere.energy.gov/informationcenter

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

DOE/EE-0371 • December 2010
Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 10% post-consumer waste.