

SOLID-STATE LIGHTING:**Manufacturing R&D Initiative Lowers Costs and Boosts Quality**

With inputs from industry experts, the initiative is successfully advancing cost-reducing solid-state lighting (SSL) production innovations.

Launched in 2009, the U.S. Department of Energy's SSL Manufacturing R&D Initiative engages producers in the drive for better-performing, lower-cost solid-state lighting, while encouraging them to engineer and manufacture in the United States. Initially funded through the American Recovery and Reinvestment Act (ARRA), the effort has demonstrated that clean energy strategies and cost-shared R&D through public-private partnerships can yield impressive results. Today, the initiative continues to co-fund R&D awarded through competitive solicitations and to build the network of companies working to strengthen U.S.-based SSL production.



Veeco engineers remove a wafer carrier from a TurboDisc K465i GaN MOCVD System.
Photo courtesy of Veeco.

A Clean Energy Showpiece

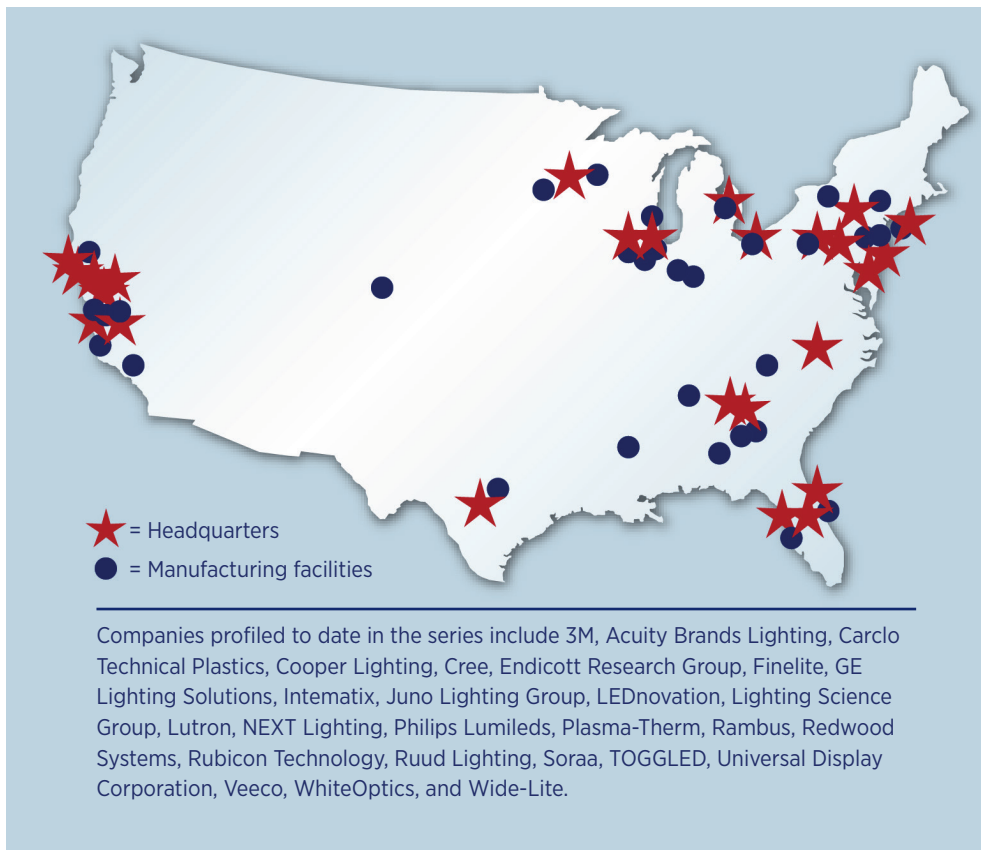
Energy saved is the cleanest energy of all. With the potential to cut electricity use in half for general lighting, SSL is a clean energy showpiece. Through the Manufacturing R&D Initiative, DOE supports projects aimed at reducing the costs of SSL sources and luminaires and improving product consistency, yield, and quality. Such production improvements will facilitate SSL market growth, lowering energy bills for American businesses and consumers and reducing

carbon emissions. The initiative also seeks to encourage domestic U.S. manufacturing within the SSL industry.

To date, DOE has supported 17 projects through the initiative, all competitively selected and funded on a cost-shared basis, with a total of \$46 million in government investments. DOE anticipates the next round of solicitations to be announced in December 2013, with awards made in 2014.



The SSL *Manufacturing R&D Roadmap* not only guides government decisions on funding solicitations but, increasingly, informs private-sector investments as well. The Roadmap reflects expert consensus on high-priority R&D opportunities where production innovations could significantly reduce risk, improve quality, increase yields, and lower costs in SSL manufacturing. Each year, the Roadmap is updated based on inputs from experts at DOE roundtables and from attendees at the annual SSL Manufacturing R&D Workshop. In addition to profiling the current state of LED and OLED production technologies, the 2013 Roadmap includes an overview of industry capabilities across the domestic and global supply chain and identifies areas of particular promise for U.S.-based manufacturers. To view the Roadmap, go to ssl.energy.gov/techroadmaps.html.



SSL

★ IN AMERICA ★

Stories of companies working to create and strengthen an SSL manufacturing base in the United States are featured in the *SSL in America* series on DOE's website. Companies of all sizes are profiled, with products ranging from replacement lamps and components to materials, controls, luminaires, power platforms, and manufacturing equipment. The *SSL in America* stories explore the business factors companies weigh to determine whether to manufacture overseas or in the U.S., including government incentives, labor costs, and proximity to markets. Many cite IP protection, access to quality labor and suppliers, capacity for rapid response to design changes, lower shipping costs, and fewer delays as factors favoring U.S.-based production.

Market Successes

In determining the most promising R&D opportunities for potential funding, DOE draws on the expertise of industry and the scientific community. One central resource is the *SSL Manufacturing R&D Roadmap*, updated annually by DOE with inputs from experts at DOE roundtables and attendees at the annual SSL Manufacturing R&D Workshop.

Projects completed through early rounds of funding under the SSL Manufacturing R&D Initiative are already yielding innovative processes and equipment that are driving improved quality and lower costs in SSL. Notable successes include KLA-Tencor's development of the Candela 8620 inspection system, Veeco Instruments' development of the Max-Bright™ multi-reactor system for metal organic chemical vapor deposition (MOCVD), and GE Lighting's develop-

ment of advanced phosphor deposition methods. Projects span the value chain of SSL production, including not only process improvements but also manufacturing equipment, materials, testing, and designs for low-cost manufacturing, and encompassing the nascent field of organic LEDs (OLEDs).

Just the Beginning

As these early successes prove, investments in clean energy technologies such as solid-state lighting can bolster U.S. industrial competitiveness while also laying the foundation for greater energy security, lower energy costs, and reduced carbon footprints. To document the impacts of the fast-emerging SSL industry, DOE has created *SSL in America*, an ongoing series on the DOE SSL website profiling companies that are manufacturing SSL products in the United States.

DOE invites you to follow the unfolding story of this evolving industry and the public-private efforts to foster a vibrant SSL manufacturing base in the United States. Learn more at www.ssl.energy.gov/sslamericapostings.html.

For More Information

To learn more about the DOE Solid-State Lighting Program, see www.ssl.energy.com.

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