

2015 Solid-State Lighting R&D Workshop

R&D Program Direction

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James R. Brodrick, Ph.D.

U.S. Department of Energy

DOE Solid-State Lighting Program Mission and Goal

MISSION

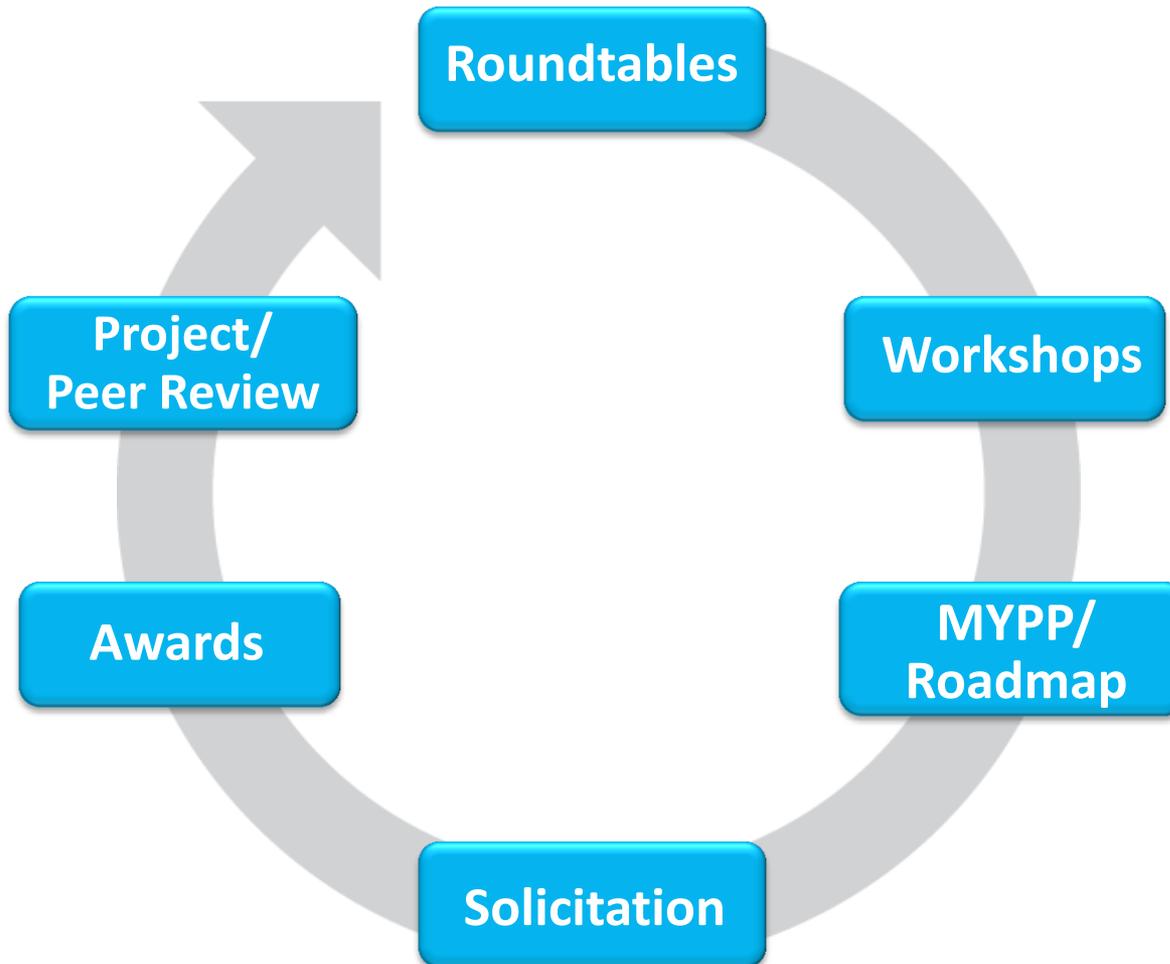
Guided by a government-industry partnership, DOE's mission is to create a new, U.S.-led market for high-efficiency, general illumination products through the advancement of semiconductor technologies, to save energy, reduce costs, and enhance the quality of the lighted environment.

GOAL

By 2025, develop advanced SSL technologies that — compared to conventional lighting technologies — are much more energy efficient, longer lasting, and cost competitive, by targeting a product system efficiency of 50 percent with lighting that accurately reproduces sunlight spectrum.

SSL Program Strategy

Industry input from Roundtables and Workshops shape DOE priorities and solicitations



Key Changes in 2015

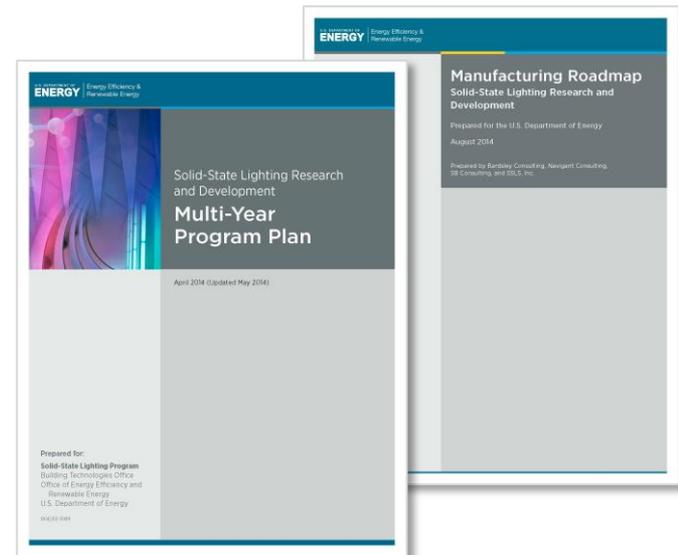
One R&D workshop, one plan, one solicitation



January and June workshops merge into one meeting

MYPP and Roadmap merge into one plan

More on this from Morgan



Key Changes in 2015

One R&D workshop, one plan, one solicitation

One FOA covers all three areas:

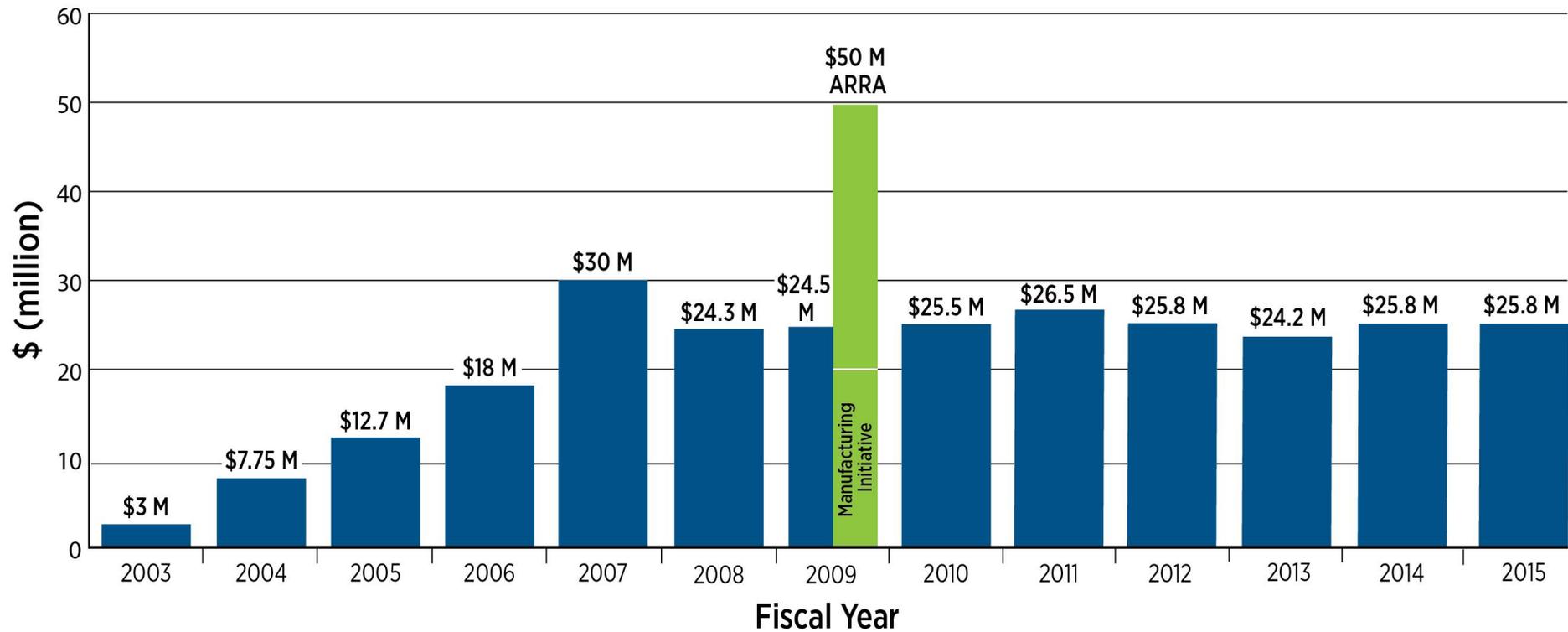
- ✓ Core Technology
- ✓ Product Development
- ✓ Manufacturing R&D

New process to streamline timing and feedback

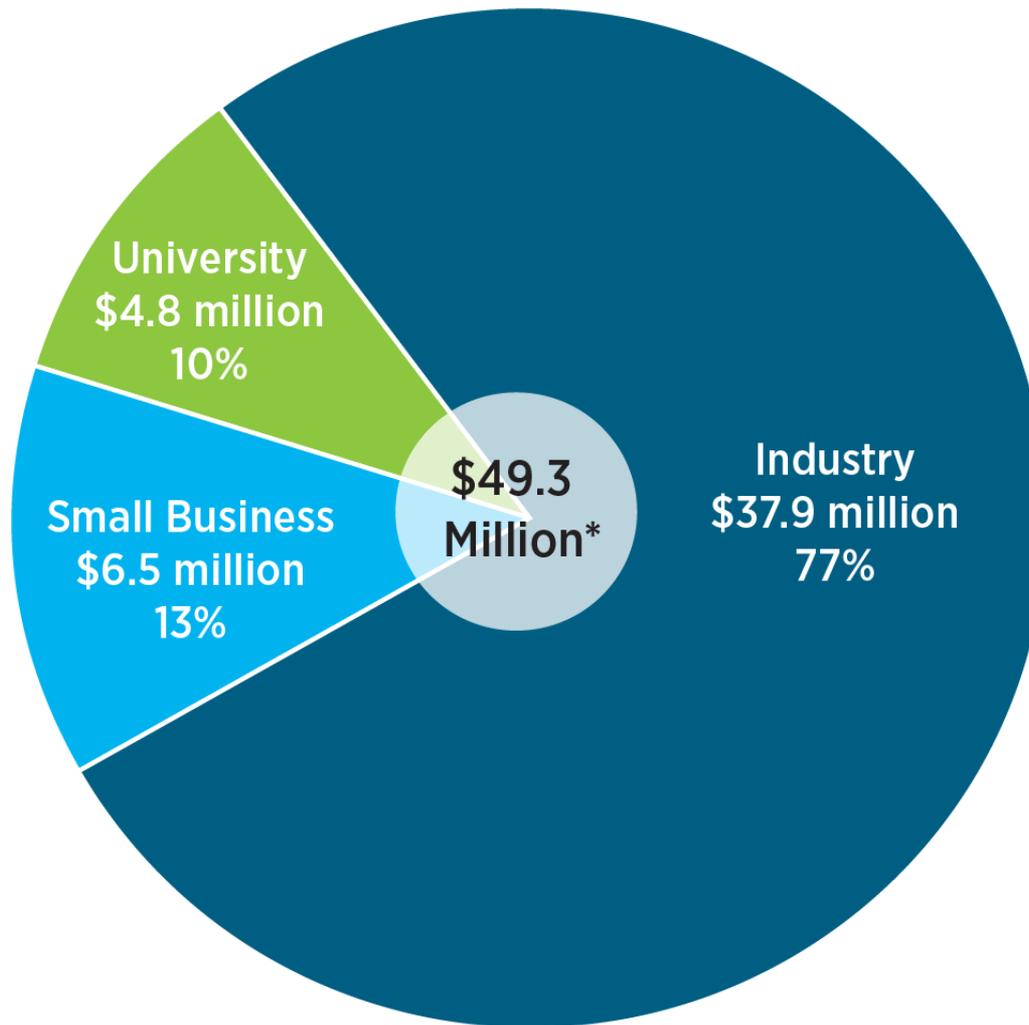
More on this from Joel



Congressional Appropriations



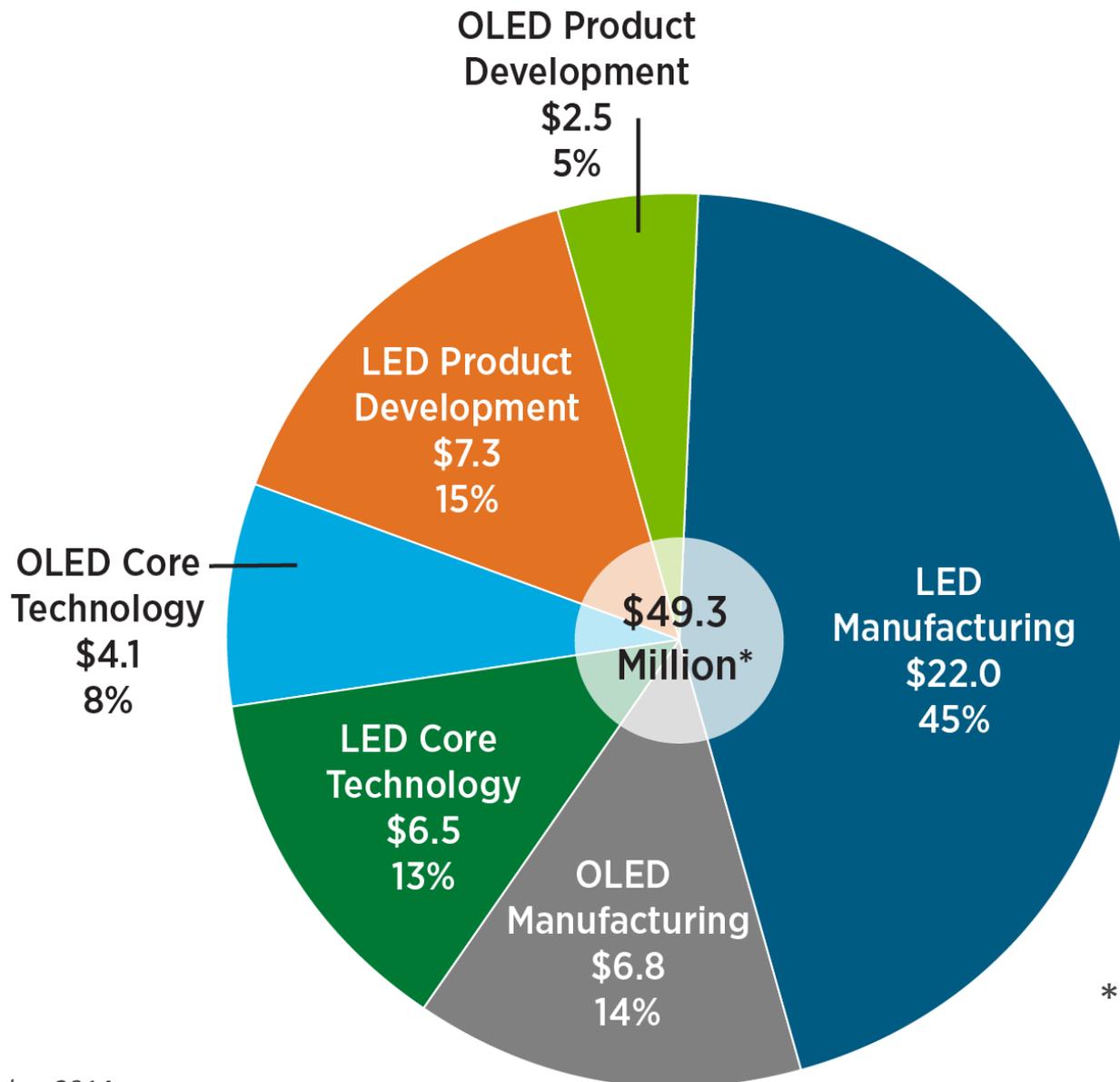
Recipients of SSL Program Investments



DOE funds SSL R&D in partnership with large and small companies, academia, and national labs

* Figures are rounded

Breakdown of Funding by Focus Area



* Figures are rounded

Core Technology Projects

Active LED Projects

Priority Task	# of Projects	Funding* (\$ Million)
Emitter Materials	1	\$1.0
Down Converters	1	\$1.9
Optimizing System Reliability	1	\$3.6

Active OLED Projects

Priority Task	# of Projects	Funding* (\$ Million)
Novel Light Extraction Approaches	3	\$3.3
Novel Materials	1	\$0.8

* Figures are rounded

Product Development Projects

Active LED Projects

Priority Task	# of Projects	Funding* (\$ Million)
LED Package Architecture	3	\$6.0
Novel Luminaire System	1	\$0.7
Lighting Systems and Controls	3	\$0.7

Active OLED Projects

Priority Task	# of Projects	Funding* (\$ Million)
Substrate	1	\$0.2
Low Cost Electrode Structures	1	\$1.8
Light Extraction	2	\$0.5

* Figures are rounded

Manufacturing R&D Projects

Active LED Projects

Priority Task	# of Projects	Funding* (\$ Million)
Package Manufacturing	1	\$3.8
Luminaire Manufacturing	2	\$9.6
Test and Inspection	1	\$8.6

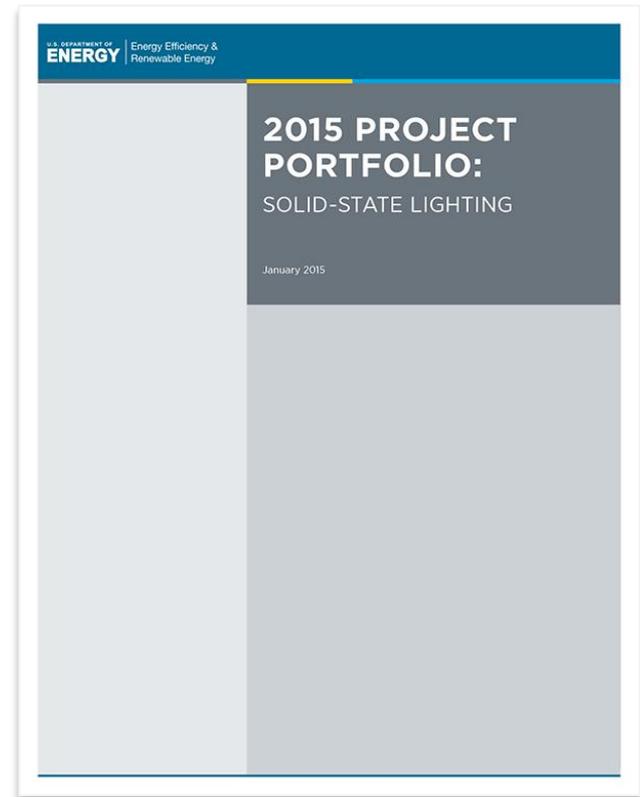
Active OLED Projects

Priority Task	# of Projects	Funding* (\$ Million)
OLED Deposition	1	\$2.1
Integrated Substrate Manufacturing	1	\$4.7

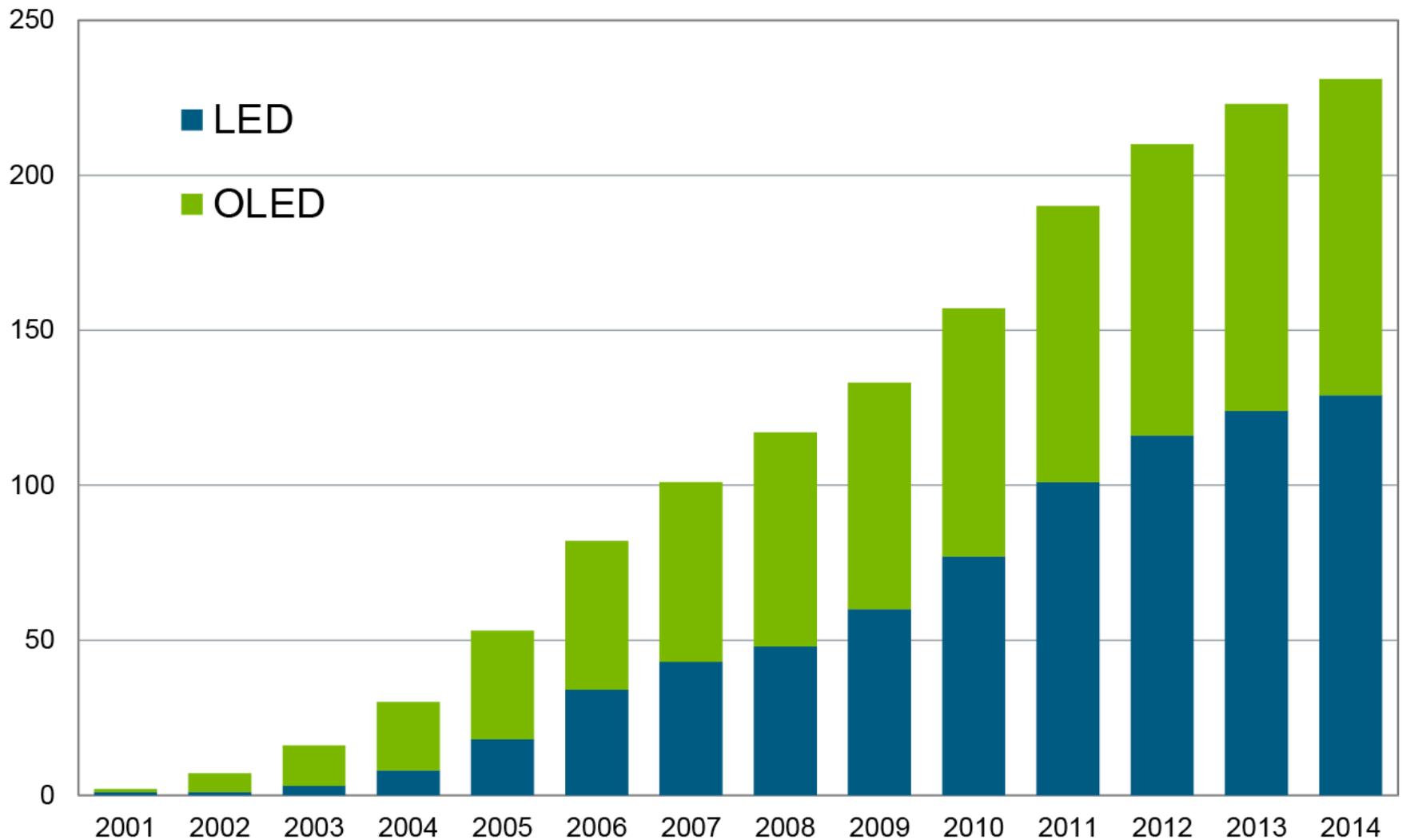
* Figures are rounded

DOE SSL Portfolio

- Results-oriented R&D
- More than 200 projects funded since 2003, with hundreds of partners
- Total current project value: \$49.3M
 - OLED: \$13.4M (10 projects)
 - LED: \$35.8M (14 projects)
- Industry and university partners provide average of 40% cost share
- 2013: LED lighting saved 188 tBtu, equivalent to annual energy cost savings of about \$1.8B



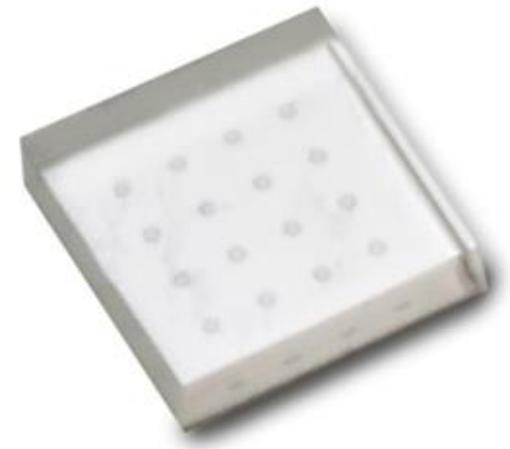
Patents Resulting from DOE-Funded Projects



FY14 Highlights



Cree develops novel technologies that lower the cost of LED troffers on the market



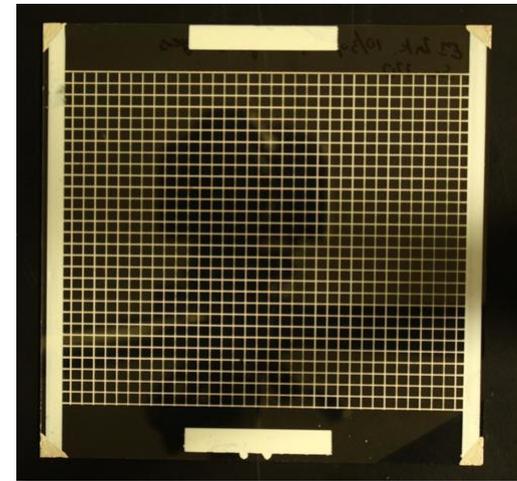
Philips Lumileds develops low-cost LED fabrication process based on patterned sapphire substrate

FY14 Highlights



Eaton develops print-based method to lower manufacturing cost of LED luminaires

Plextronics improves efficacy of OLED lab devices by reducing surface resistance



FY14 Highlights



OLEDWorks develops deposition technology for low-cost manufacturing of OLED lighting

Learn More About Current Projects



Collaboration & Coordination Create a Bridge



SSL Program R&D



Small Business Innovation Research (SBIR) Program



Basic Energy Sciences



Advanced Research Projects Agency–Energy (ARPA-E)



Advanced Manufacturing Office



National Science Foundation SBIR Program

SSL Program Is Continuously Evolving

- 2013: New focus on fostering collaboration to accelerate OLED technology advances
 - OLED Stakeholder Meetings
 - Testing Opportunity
- 2014: Expanded focus on lighting systems
 - Lighting systems research
 - Technical support for ANSI C137 (Lighting Systems), IEEE P1789 (Flicker), IES Color Metric Task Group
- 2015: Expanded focus on controls
 - Advanced controls research, education
 - Technical support for standards and industry consortiums



2014: First OLED products recognized by Next Generation Luminaires Competition

Our Challenge

- Tremendous progress to date, still much to do
- What future R&D will drive the next leaps forward?
- What R&D is needed to support value-added features?
- What efforts should be led by DOE?
By industry? By consortia?

Let's get started!





The reward for
work well done
is the opportunity
to do more.

– Jonas Salk