



Assessing Solid State Lighting Products & Projects for Funding

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The Problem

- **Sudden and expanding demand for LED lighting projects**
- **Rapidly advancing technology**
- **Established product evaluation and standards protocols & their related organizations move slowly**

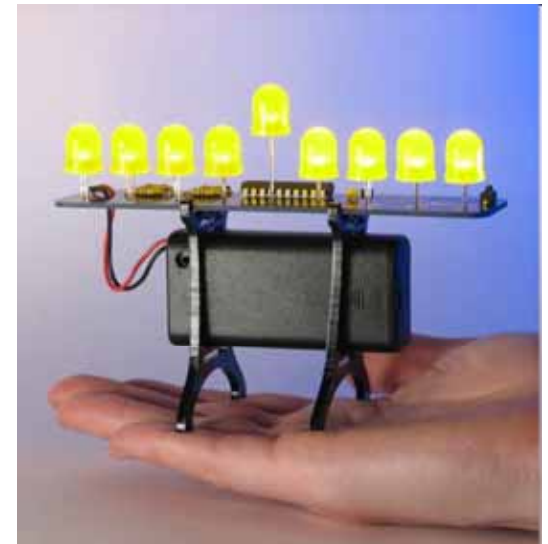
History Repeats

Edison's Lamp - Stimulated a lighting industry & established a need for large central stations, beginning with Niagara Falls



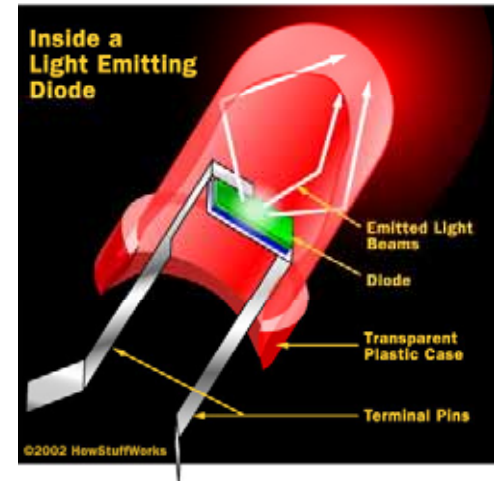
The Need for New Metrics and Procedures

- Efficiency programs rely on long standing testing procedures for fluorescent/HID
- Lighting industry has yet to agree on performance metrics or testing procedures



What's the Deal?

- LEDs didn't grow up in the lighting industry
- A diode is an electronic component made with semiconductor materials such as silicon.
- Diodes - Rectifiers, signal limiters, voltage regulators, switches, signal modulators, signal mixers, and oscillators



The Industry Drive Towards Acceptance

- Bringing LED products - multi-million dollar investment.
- Philips Lighting - \$791 million for the acquisition of Color Kinetics
- Efficiency program acceptance is critical



DOE and EPA Enter the Picture

- In 2008 the two agencies published different criteria for the joint *Energy Star* program.
- Confusion - Manufacturers & efficiency programs could not determine if a product satisfied all criteria.
- As the DOE and EPA resolve the issues, the industry pushes ahead.

As the DOE and EPA Come Together – the Industry Pushes Ahead

2006 U.S. Government Accountability Office (GAO) Report:

“DOE has missed all 34 congressional deadlines for setting energy efficiency standards for all 20 product categories.”

DOE’s delays ranged from less than a year to ***15 years.***

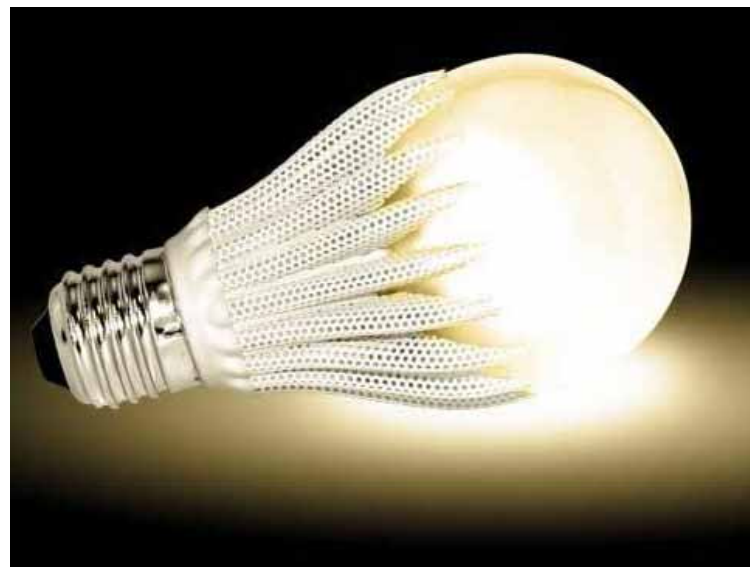
The IESNA – LM-79 and LM-80

- **LM-79 Electrical and Photometric Test**
- **LM-80 Lumen Maintenance/Useful Life Test**



DOE Market Initiatives

- **L-Prize**
- **Quality Advocates**
- **Gateway Demonstrations**
- **CALiPER**



DesignLights™ Qualified SSL Products List Program

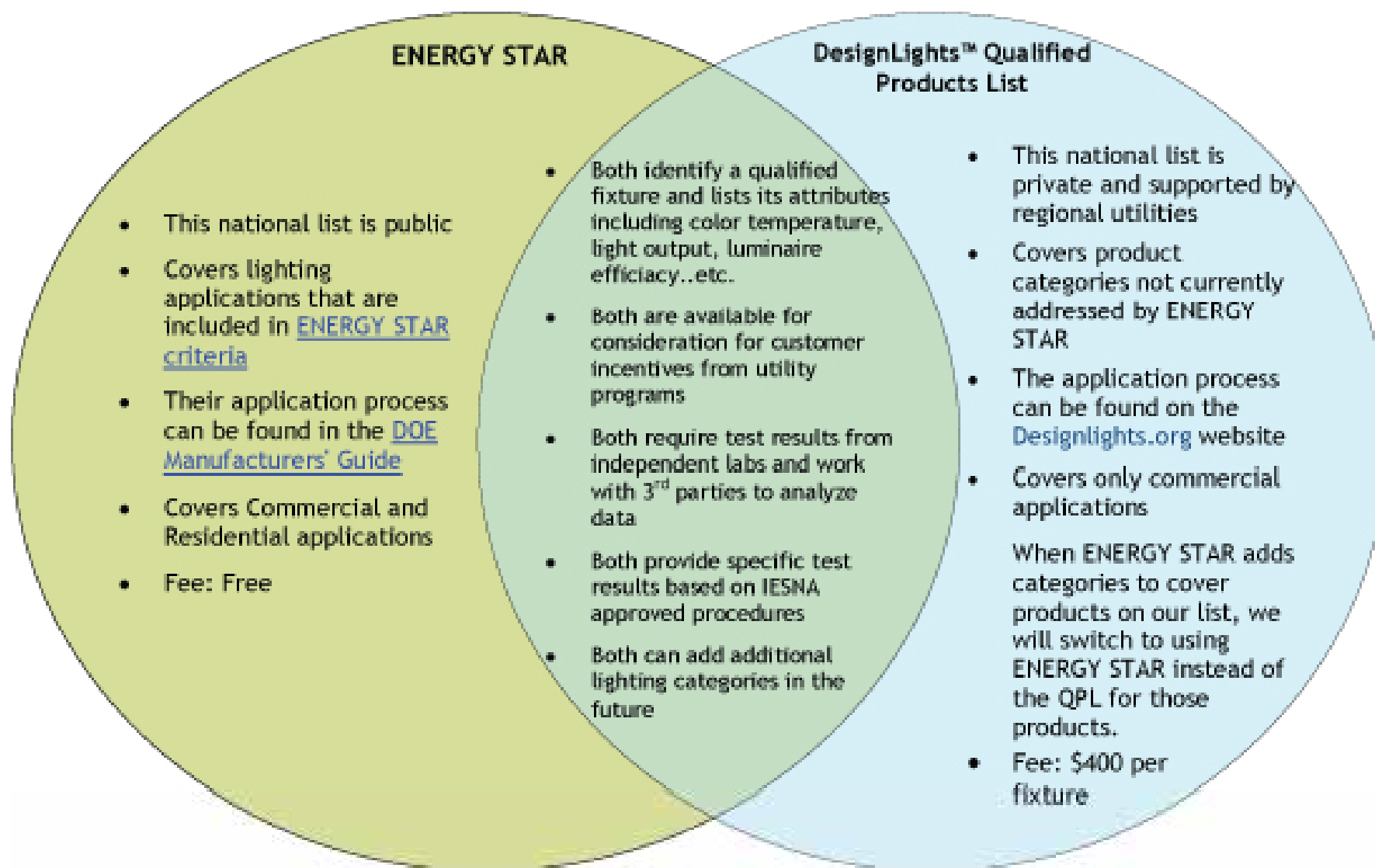
- 11 Northeastern States
- Build on Energy Star
 - Don't reinvent
- Require & Review
 - LM79
 - LM80
 - In Situ Temperature Measurement Test
 - Lifetime L70 determination
 - 3 Year minimum warranty



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Farnsworth Museum – Exhibit Lighting Efficiency Maine Project

- 482 - 75 watt Par30 lamps > 482 (9 & 15 watt) LED Spotlights
- 32kW demand reduction
 - 2.5 year simple payback
 - Reduced UV radiation on artwork

Review Process

- LM79 approved
- LM-80 test results not available due to costs and time constraints
- Compromise - A warranty agreement that 70% of the initial lumen output be maintained for 5 years

Gas Station Canopy Lighting Vermont Project Rejected for Funding

16 - 320W MH fixtures > 16 -
85W LED Module Retrofit
Kits

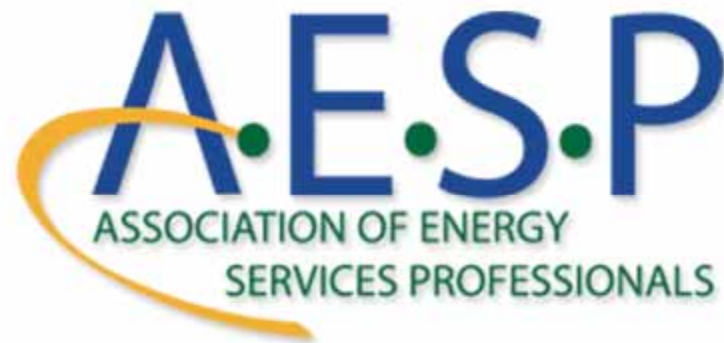
Review Process

- LM79 & LM-80 test results supplied
- But the tests were for new fixtures not retrofits
- Manufacturer declined to test module



First Year Lessons Learned

- Technology advancing faster than testing protocols
- SSL market is at a delicate stage – much excitement, but can expectations be met?
- Quality of products varies greatly
- Unsupported and misleading claims abound
- The stakes are too high to repeat the mistakes of CFL introduction
- Sound tools are needed to assure product quality and customer satisfaction



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