



The Parker Ranch installation in Hawaii

Interior Lighting Efficiency for Municipalities

June 29, 2011

Michael Myer

Presenter - Pacific Northwest National Laboratory

Steve Kismohr

Host - Midwest Energy Efficiency Alliance

With this webinar, you will gain:

1. A Basic Understanding of Lighting Terminology
2. Ability to Identify Different Types of Lamps (Bulbs) and Luminaires (Light Fixtures)
3. An Understanding of the Importance of Energy Efficiency in Lighting
4. Knowledge of where to Find Financial Resources
5. Ability to Search Out Design/Technical Resources

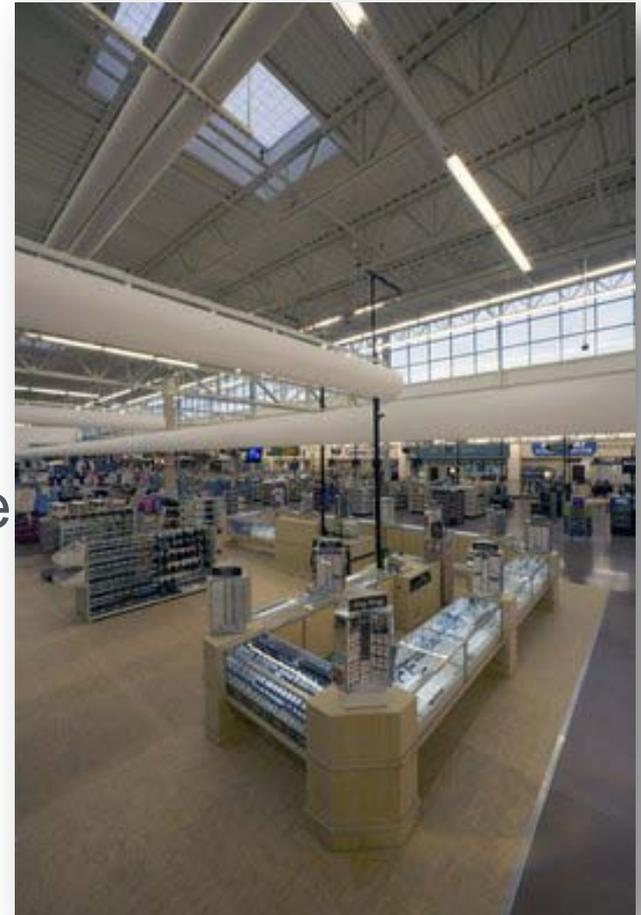


Image courtesy of NREL – Integrated Daylighting, Light Sensors, and Energy Efficient Lighting

What is TAP?

DOE's Technical Assistance Program (TAP) supports the Energy Efficiency and Conservation Block Grant Program (EECBG) and the State Energy Program (SEP) by providing state, local, and tribal officials the tools and resources needed to implement successful and sustainable clean energy programs.



TAP offers:

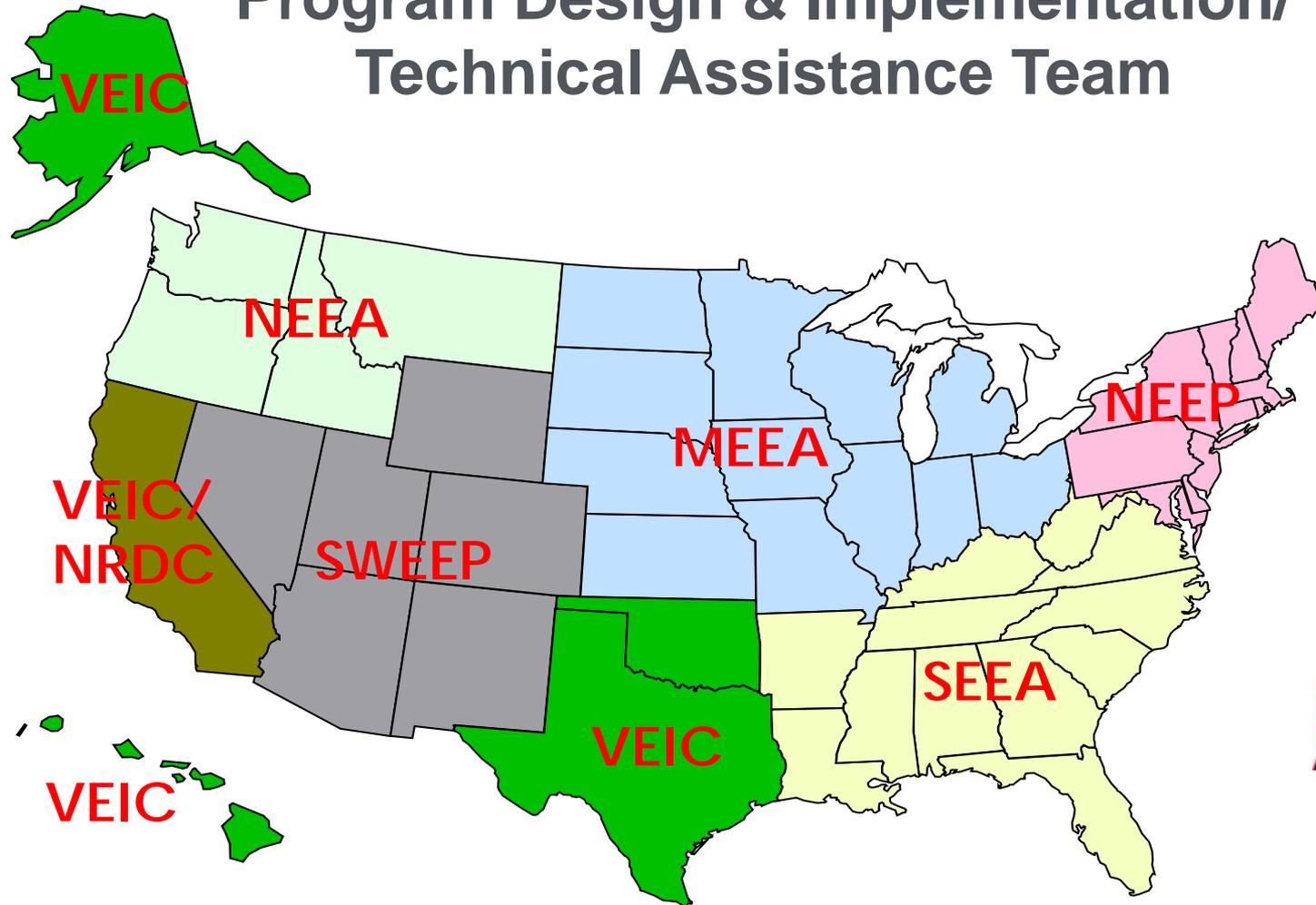
- One-on-one assistance
- Extensive online resource library, including:
 - Webinars
 - Events calendar
 - TAP Blog
 - Best practices and project resources
- Facilitation of peer exchange

Topics include:

- State and local capacity building
- Energy efficiency and renewable energy technologies
- Program design and implementation
- Financing
- Performance contracting

State and Local Capacity Building	<ul style="list-style-type: none">• Trainings• Workshops• Peer-to-peer matching
Technical	<ul style="list-style-type: none">• Renewable energy siting and development• Review of technical specs for RFPs• Strategic planning, energy management, and conservation strategies• Green building technologies• Building codes
Program Design and Implementation	<ul style="list-style-type: none">• Policy and program development• Coordinating rate-payer funded dollars with ARRA projects and programs• Sustainable community and building design• State and regional EE and RE assessments and planning• EE and RE portfolio program design elements
Financial	Program design support and guidance on financing mechanisms such as: <ul style="list-style-type: none">• Revolving loan funds (RLFs)• Property-assessed clean energy (PACE)• Loan loss reserves and enhanced credit mechanisms
Performance Contracting	<ul style="list-style-type: none">• Designing and implementing a performance contract• Leveraging private investment• Reducing institutional barriers• Tracking and comparing programs

Program Design & Implementation/ Technical Assistance Team



ACEEE, NRDC: National Support



- Quick Lighting Basics
- Quick Lamp Review
- Quick Luminaire (Fixture) Review
- Daylighting
- Financial Resources
- Design/Technical Resources



Image courtesy of NREL – Daylighting Testing in Office of the Future

- Terms
 - Lumen
 - Intensity
 - Color Rendering Index
 - Correlated Color Temperature
 - Power
 - Energy
 - Efficacy
 - Illuminance



Image courtesy of MEEA

- Lumen
 - Basic unit of light
 - A measure of the total light output of a source
- Intensity
 - Amount of lumens per solid angle
 - Which means light going in a specific direction



Images courtesy of “Language of Light”
copyright Minolta

- Color Rendering Index
 - Abbreviated as CRI
 - How well a source renders color compared to a reference source
 - Ranges from 0 – 100
 - No saturated samples under light source
 - Has limitations
- Color Quality Scale
 - Developed by NIST
 - Similar to CRI
 - Larger mix of samples

Lighting Technology	Color Rendering Index (typical)
Low-Pressure Sodium (LPS)	5
Mercury Vapor	17 - 50
High-Pressure Sodium (HPS)	22
Metal Halide	65 – 80
Fluorescent / Induction	82- 90
Light-Emitting Diode (LED)	65 - 85
Sunlight, incandescent light	100

Table Courtesy of MEEA



Image courtesy of NIST

- Correlated Color Temperature
 - Abbreviated as CCT
 - Appearance of light source
 - Low values are “warm”
 - Neutral Values are “white”
 - High values are “cooler” or “bluish”
 - Interiors typically in the 3000K – 5000K

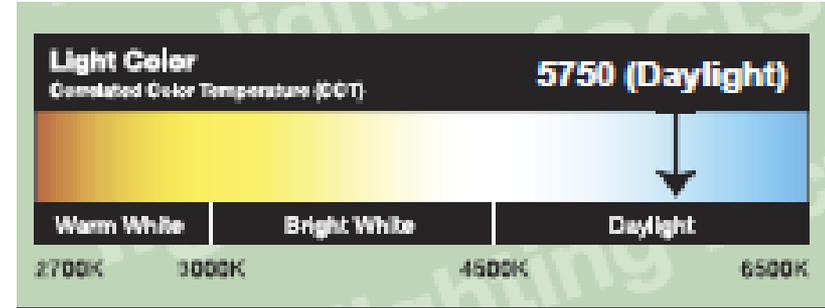


Image courtesy of Lighting Facts

- Power
 - Rate of energy
 - Measured in watts (W)
 - Instantaneous, not consumed
- Energy
 - Power (W) x Time (hours)
 - Controls can reduce time and save energy
- Efficacy
 - Conversion e.g., power → light
 - For lighting – lumens / watt (lm/W)
 - Similar to car's miles per gallon



Image Courtesy of PNNL

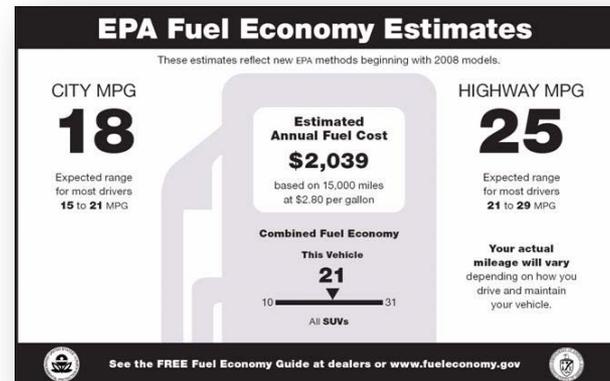


Image Courtesy of EPA

- Illuminance
 - Describes the amount of light falling on a surface
 - Lumens / square foot = footcandles (fc)
 - Typically horizontal, but some times vertical as well
 - Easiest metric to measure in the field
 - Not what the “eye sees”
 - Light is reflected back to the eye – need to factor in materials



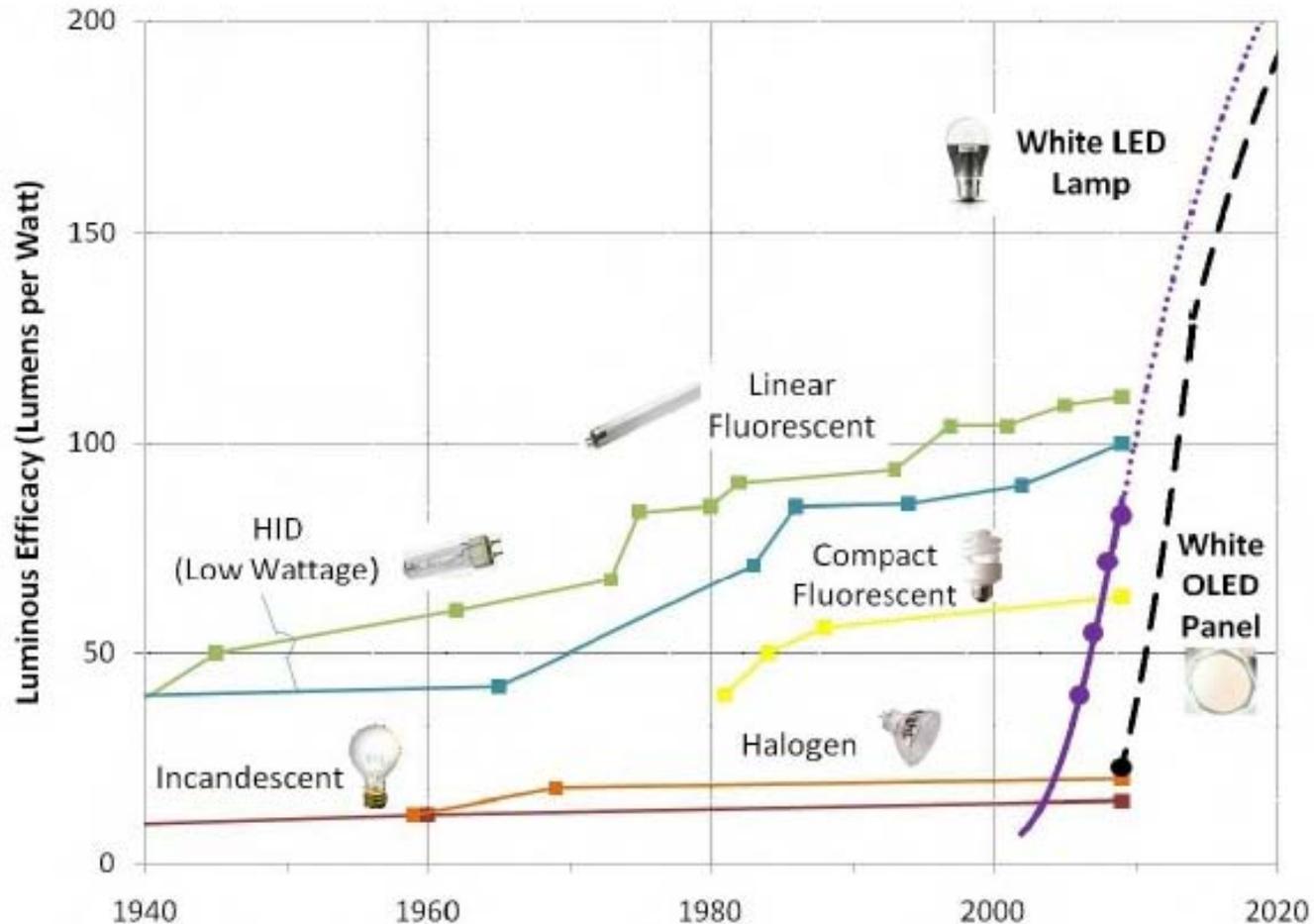
Images Courtesy of Pacific Northwest
National Laboratory

- Incandescent Lamps
 - No “phase-out” or “ban”
- Fluorescent Lamps
 - Overview
 - Federal Standards
 - High Performance T8s
- LEDs
 - Multiple light-emitting diodes
- Lamp Labels + Standards
 - Overview



Image Courtesy of Robert Catalano, Willowbrook, NY

Lamp Performance is Continuously Improving



Source: Navigant Consulting, Inc – Updated Lumiled’s chart with data from product catalogues and press releases

- Incandescent lamps are not being “banned”
- New Federal lamp standards
 - Sets a minimum lumen output
 - Sets a maximum power input
 - Lamps need to be 30% more efficient
 - “100 W” → “72 W”
- Manufacturers already make compliant halogen versions of the lamp

HOME PAGE TODAY'S PAPER VIDEO MOST POPULAR TIMES TOPICS

The New York Times Magazine

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

Bulb In, Bulb Out



Kenji Aoki for The New York Times

A 100-year-old-technology that is essential to modern life is about to be snuffed out. Yikes.

By ANDREW RICE
Published: June 3, 2011

Over the past few years, in conditions of strict secrecy, a multinational team of scientists has been making a mighty effort to change the light bulb. The prototype they've developed is four inches tall, with a familiar tapered shape, and unlighted, it resembles a neon yellow mushroom. Screw it in and switch it on, though, and it blazes

RECOMMEND
TWITTER
COMMENTS (127)
SIGN IN TO

Article Courtesy of NY Times

http://www.nytimes.com/2011/06/05/magazine/bulb-in-bulb-out.html?_r=4

- New Federal standards for general service fluorescent lamps (GSFL)
- T12 lamps going away
 - As of 2010, 30% of fluorescent lamps sold were T12 per National Lighting Bureau
- 30W / 28W / 25W
- Current Technology
 - T8 / T5 / T5HO

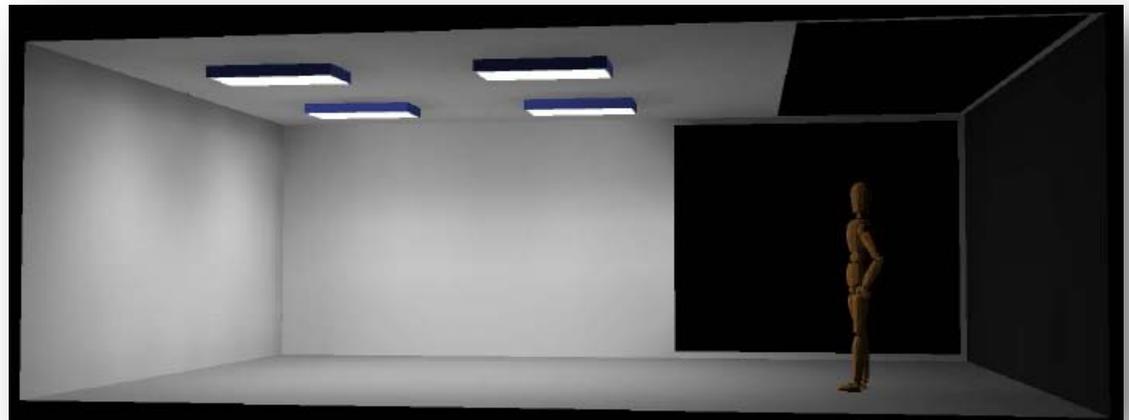


Image Courtesy of Pacific Northwest National Laboratory

Fluorescent Lamps

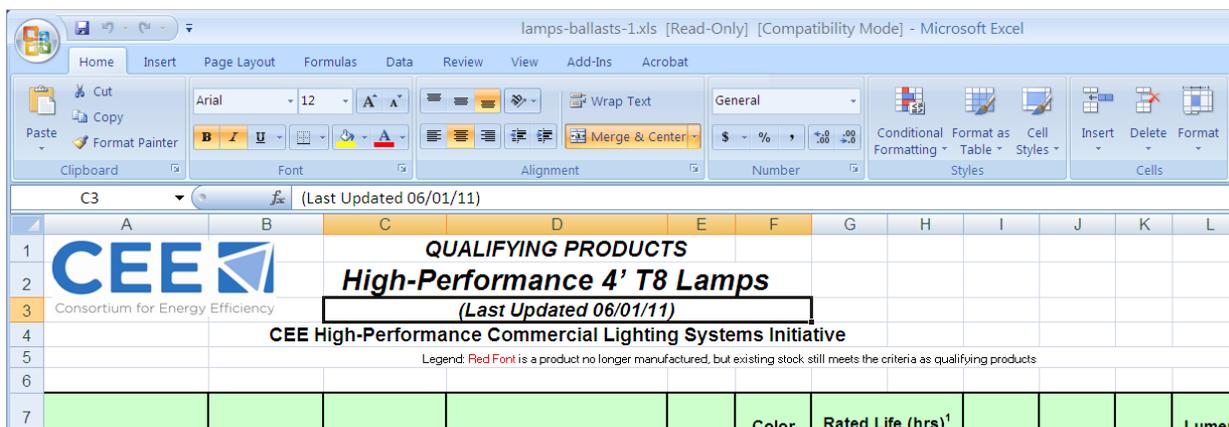
New Federal Standards

- Efficacy requirements for GSFLs
 - “Mini Bi-Pin” refers to T5 or T5HO

Lamp Type	Minimum Lamp Efficacy (lm/W)	
	CCT _≤ 4500K	4500K < CCT _≤ 7000K
2-Foot U-Shaped	84	81
4-Foot Medium Bi-Pin Based	89	88
4-Foot Mini Bi-Pin Based Standard Output	86	81
4-Foot Mini Bi-Pin Based High Output	76	72
8-Foot Slimline	97	93
8-Foot High Output	92	88

Source: U.S. Department of Energy, Final Rule Technical Support Document: Energy Conservation Standards for General Service Fluorescent Lamps and Incandescent Reflector Lamps, July 2009.

Fluorescent Lamps High-Performance T8 Lighting Systems

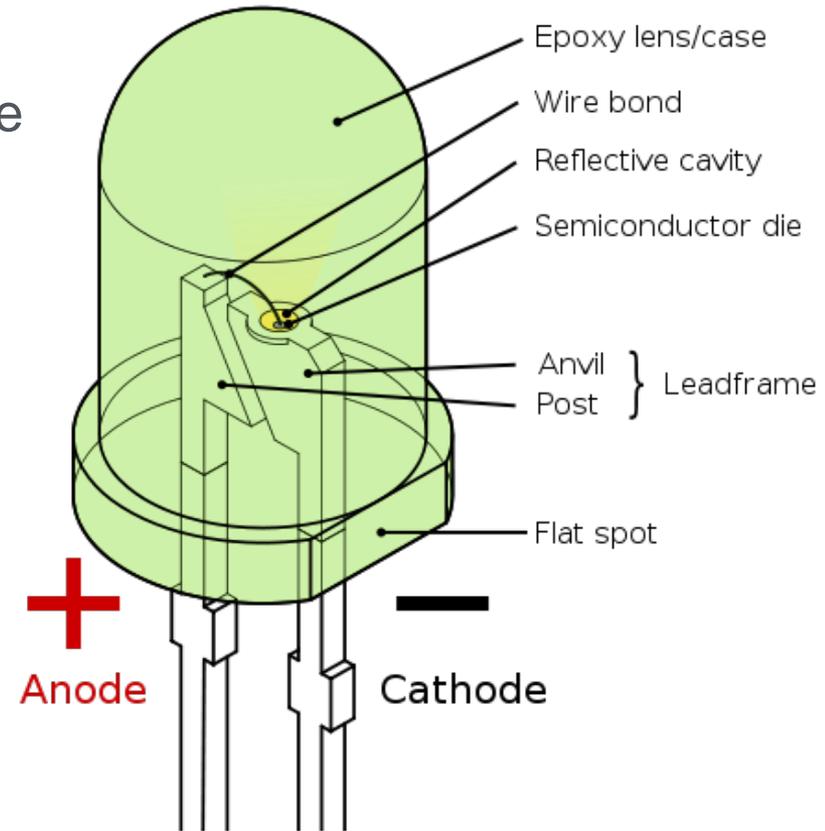


				Color	Rated Life (hrs) ¹				Lumen	
26	Halco Lighting Technologies	ProLume	EP232IS/L/MV/HE	yes	120/277	I	Normal	0.95	30	3.17
27			EP232IS/MV/HE	yes	120/277	I	High	1.05	33	3.18
28			EP232IS/120/SL	yes	120	I	High	1.15	38	3.03
29			EP232IS/MV/SL	yes	120/277	I	High	1.15	38	3.03
30			HL232AIS/UV/HE/W	no	120/277	I	Normal	0.95		30

20	CRI Lighting	N/A	n/a	F32T8/835 XP	Linear	3500	24,000	30,000	3100	2950	83	0.94
21				F32T8/841 XP	Linear	4100	24,000	30,000	3100	2950	83	0.94
22				F32T8/850 XP	Linear	5000	24,000	30,000	3100	2950	83	0.94
23	DLU Lighting USA	Tri-Lux	FLTHNVX5V	F32T8/841TL	Linear	4100	24,000	24,000	3150	2950	85	0.94
24			FLTHNVX6V	F32T8/850TL	Linear	5000	24,000	24,000	3150	2950	85	0.94
25			FLTHNVXDV	F32T8/859TL	Linear	5900	24,000	24,000	3150	2975	85	0.94
26	Eiko	Eiko High Lumen	n/a	F32T8/830K/HL	Linear	3000	24,000	24,000	3100	2915	83	0.94
27			n/a	F32T8/835K/HL	Linear	3500	24,000	24,000	3100	2915	83	0.94
28			n/a	F32T8/841K/HL	Linear	4100	24,000	24,000	3100	2915	83	0.94
29			n/a	F32T8/850K/HL	Linear	5000	24,000	24,000	3000	2820	83	0.94
30			n/a	F32T8/865K/HL	Linear	6500	24,000	24,000	3000	2820	83	0.94
31	Esen Technology, Inc.	Elite HE	13986	F32T8/827/HE	Linear	2700	24,000	30,000	3100	2915	85	0.94
32			13987	F32T8/830/HE	Linear	3000	24,000	30,000	3100	2915	85	0.94
33			13988	F32T8/835/HE	Linear	3500	24,000	30,000	3100	2915	85	0.94

<http://www.cee1.org/>

- Most solid-state lighting (SSL) based on light-emitting diodes (LEDs)
- Not a new technology
- LED light output, color, and lifetime have been improving over the years
- Key benefits:
 - Energy savings
 - Directionality
 - New form factors
- In recent years, cost-effective general illumination with LEDs has become feasible
- “T8 replacement” lamps require ballast removal for replacement



- Required by Congress
 - EISA 2007
- Similar to food nutrition label
- Start date: July 2011 → Jan. 2012
- Applicable to Incandescent/CFL/LED
- Label requirements
 - “Brightness” – lumens/light output
 - Life – based on 3 hours/day
 - “Light Appearance” – correlated color temperature
 - “Energy Used” – actually power draw
 - If contains mercury, must clearly state it

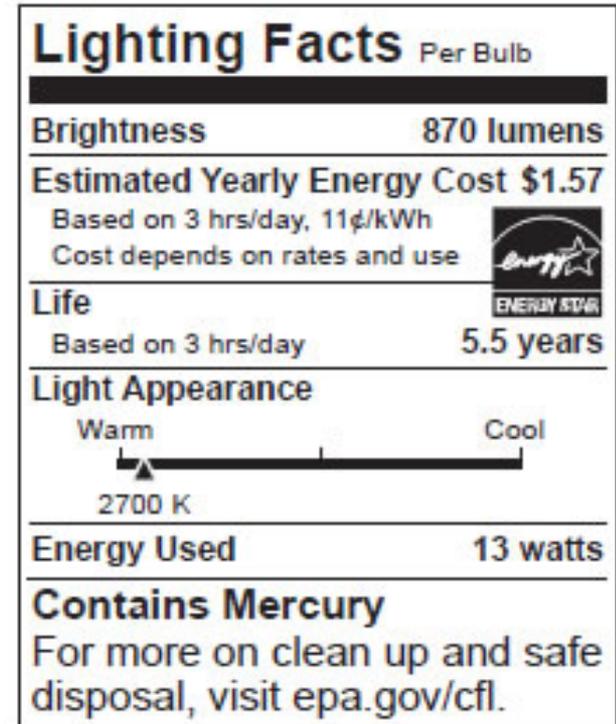


Image Courtesy of the Federal Trade Commission
<http://www.ftc.gov/opa/2010/06/lightbulbs.shtm>

- Downlights
 - Small portion of luminaires in interior applications
- High Bay
 - Most often used in warehouses and high ceiling spaces like transportation bays
- Troffers
 - Major luminaire type in many offices
 - 2 x 4s
 - 2 x 2s



Image Courtesy of Pacific Northwest National Laboratory

- Overview
 - Recessed (or surface) box luminaire
 - Typically low fixture efficiency
 - Not uncommon for 40% or more light to be absorbed inside fixture
- Options
 - Screw-base CFLs save energy, but can change distribution
 - Screw-base LEDs can save energy, but change distribution
 - Consider insert kit
 - Replace with new light source and integral optics



Images Courtesy of Pacific Northwest National Laboratory

- Overview
 - Suspended or surface-mounted to structure luminaires
 - Traditionally metal halide (MH), but are being displaced by high-intensity fluorescent (HIF) and LED
- Options
 - HIF provides great lumen maintenance
 - Non-MH fixtures can be controlled with occupancy sensors or daylight sensors



Image Courtesy of Pacific Northwest National Laboratory

- Overview
 - Recessed (or surface) box luminaire
 - Optical options – lensed, parabolic louver, “basket”, and high-performance lens (volumetric)
- Fluorescent Options
 - Consider changing ballast factor
 - Consider replacement kit
 - Consider new 2-lamp luminaire
 - Consider reduced wattage lamp
- Other Options
 - LED 2x4s possible option



Images Courtesy of Pacific Northwest
National Laboratory



Image Courtesy of PNNL

Overview:

- Started in November 2010 with specification in development
- Energy savings 20% from technology and more from controls
- Technology neutral
- Contain elements on dimming, emergency power, controls, and air filtration

http://www1.eere.energy.gov/buildings/alliances/high_efficiency_troffers.html

High Efficiency 2'x2' Troffer Specification



Image Courtesy of Pacific Northwest
National Laboratory

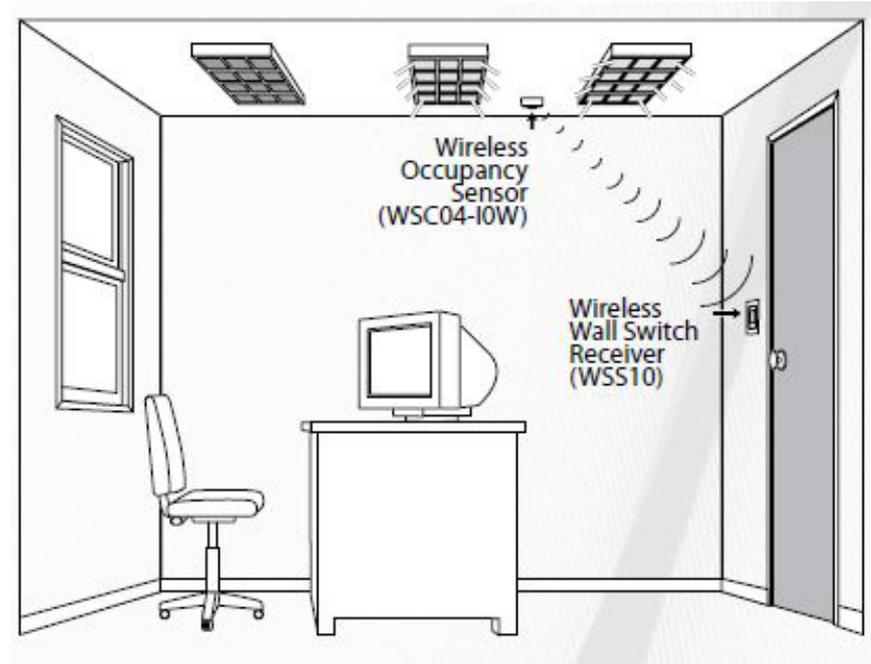
- Maximum Input Power: 54W
- THD: 50%
- Power Factor: 0.90
- Fluorescent or LED
- Dimensions
 - 24" x 24" x 5" (deep)
- 3,000 lumens
- CRI: 80+



Image Courtesy of Pacific Northwest
National Laboratory

- Emergency Lighting
 - Battery packs
- Contained within ceiling
 - Clean Room / Healthcare Applications
- Controls should lead to greater savings
- Dimming
 - Continuous dimming
 - Step dimming to 50%
- Occupancy sensors
- Other control systems
 - DC voltage

- Daylighting Controls
 - Controls on/off OR dimming of electrical lighting
 - Savings 16% - 50%
 - Depends on space type
- Occupancy Sensors
 - Controls on/off of electrical lighting
 - Savings 17% - 60%
 - Depends on space type
 - Depends on occupancy patterns



Courtesy of Lighting Controls Association

- Consider
 - Location and orientation of building
 - Size of windows
 - Obstructions
- Rules of Thumb
 - Daylighting effective up to 2x the window head height
 - Daylighting effective up to 30' from window under good design
- Sensor strategies
 - Open Loop – sensor only measures daylight
 - Closed Loop – sensor measures both electric and daylight



Image Courtesy of National Renewable Energy Laboratory

- Consider
 - Placement of sensor
 - Grouping of luminaires controlled
 - Obstructions
- Types of occupancy sensors
 - Passive infrared (PIR)
 - Ultrasonic
 - Dual technology
- Vacancy Sensor
 - Manual On
 - Auto Off



Image Courtesy of PNNL

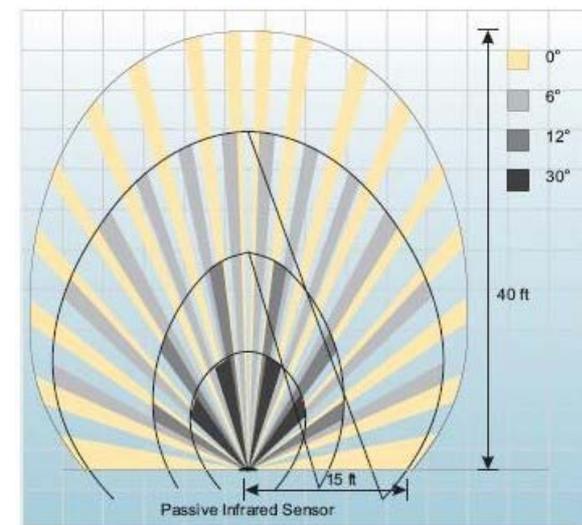
Occupancy Sensors Energy Savings Potential

Space Type	Savings Potential All Hours	Savings Potential Normal Hours	Savings Potential After Hours
Restroom	60%	18%	42%
Conference Room	50%	27%	23%
Private Office	38%	25%	13%
Break Room	29%	14%	15%
Classroom	55%	23%	35%

Lighting Controls Association

- “Maniccia, D. et al, “An Analysis of the Energy and Cost Savings Potential of Occupancy Sensors for Commercial Lighting Systems”

- **Passive Infrared (PIR)**
 - Movement must “break beam”
 - Most sensitive to movement that is parallel to sensor
 - Coverage gaps get larger the farther from sensor
- **Ultrasonic**
 - Emits sound waves (“active”)
 - Uses Doppler technology to detect movement
- **Dual Technology**
 - Uses both technologies



Images Courtesy of the Lighting Controls Association

- 179D Tax Incentive
 - All elements of lighting
 - Caution
 - NEMA web site
 - Sample Tool
 - 179d.energy.gov
- Federal Grants
 - Recovery Act
- Utility incentives and State incentives
 - Prescriptive
 - Custom



Financial Incentives for Lighting Power Densities (LPDs)

- Sliding scale reductions for taxes
- \$0.30 / sf when lighting is 0.225 W/sf
- \$0.60 / sf when lighting is 0.18 W/sf
- End date December 31, 2013 – can file paperwork after date
- IRS Notice 2008-40 issued March 7, 2008
- Gov't Structures \$\$ → Design Team

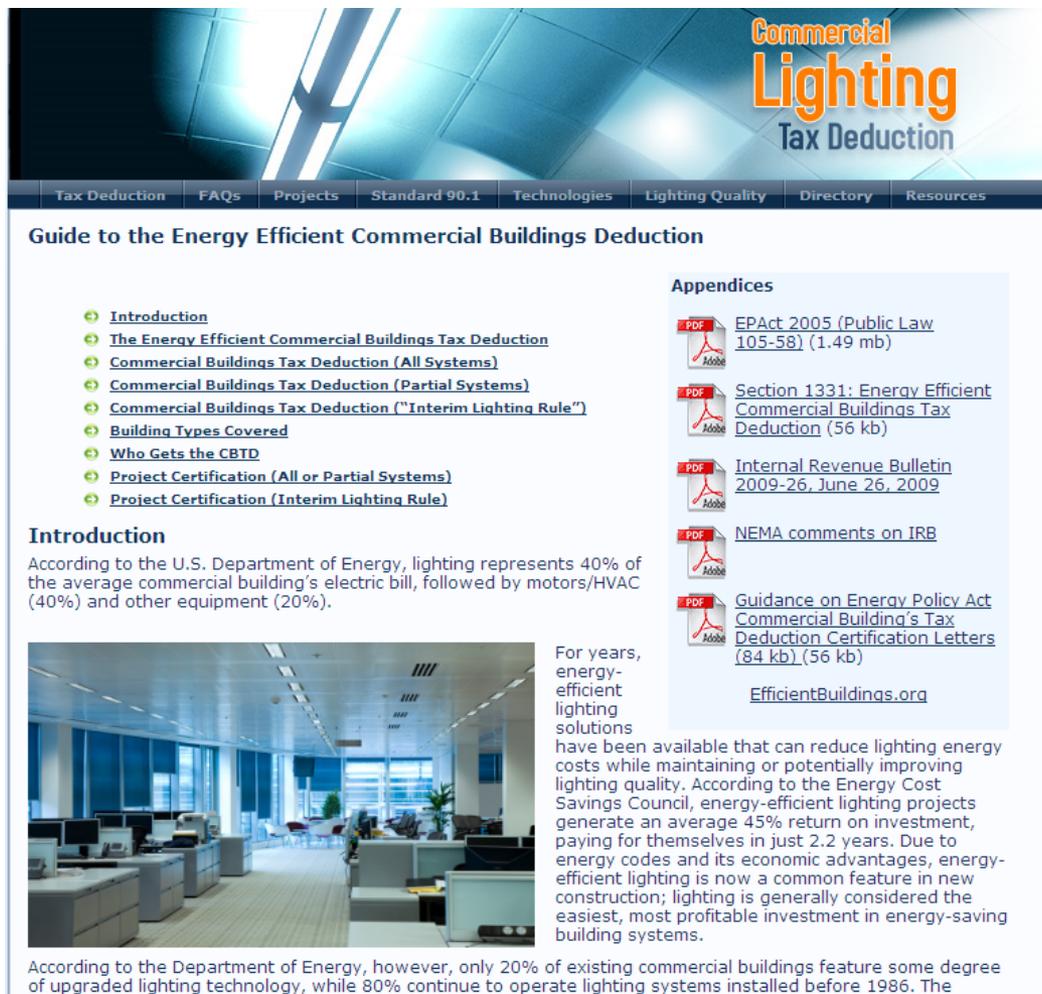


Image Courtesy of Pacific Northwest National
Laboratory

Parking Structures → Low-hanging fruit

Contains:

- Information
- Draft letters
- IRS Bulletins
- FAQs
- Resources



Commercial Lighting Tax Deduction

Tax Deduction | FAQs | Projects | Standard 90.1 | Technologies | Lighting Quality | Directory | Resources

Guide to the Energy Efficient Commercial Buildings Deduction

- [Introduction](#)
- [The Energy Efficient Commercial Buildings Tax Deduction](#)
- [Commercial Buildings Tax Deduction \(All Systems\)](#)
- [Commercial Buildings Tax Deduction \(Partial Systems\)](#)
- [Commercial Buildings Tax Deduction \("Interim Lighting Rule"\)](#)
- [Building Types Covered](#)
- [Who Gets the CBTD](#)
- [Project Certification \(All or Partial Systems\)](#)
- [Project Certification \(Interim Lighting Rule\)](#)

Appendices

- [PDF](#) [EPA Act 2005 \(Public Law 105-58\)](#) (1.49 mb)
- [PDF](#) [Section 1331: Energy Efficient Commercial Buildings Tax Deduction](#) (56 kb)
- [PDF](#) [Internal Revenue Bulletin 2009-26, June 26, 2009](#)
- [PDF](#) [NEMA comments on IRB](#)
- [PDF](#) [Guidance on Energy Policy Act Commercial Building's Tax Deduction Certification Letters](#) (84 kb) (56 kb)

[EfficientBuildings.org](#)

Introduction

According to the U.S. Department of Energy, lighting represents 40% of the average commercial building's electric bill, followed by motors/HVAC (40%) and other equipment (20%).



For years, energy-efficient lighting solutions have been available that can reduce lighting energy costs while maintaining or potentially improving lighting quality. According to the Energy Cost Savings Council, energy-efficient lighting projects generate an average 45% return on investment, paying for themselves in just 2.2 years. Due to energy codes and its economic advantages, energy-efficient lighting is now a common feature in new construction; lighting is generally considered the easiest, most profitable investment in energy-saving building systems.

According to the Department of Energy, however, only 20% of existing commercial buildings feature some degree of upgraded lighting technology, while 80% continue to operate lighting systems installed before 1986. The

<http://www.lightingtaxdeduction.org/>



GE
Lighting

NO ENDORSEMENT

Environmental Information Center

Regulations & Resources

Ads, Articles & Conferences

Products

Tools & Calculators

ecomaginationSM

[Contact Us](#) | [GE Lighting](#) | [GE Electrical](#)

Home

Tools & Calculators

EPAct Tax Deduction
Eligibility Estimator

Legislation Product
Replacement Tool

EPAct TAX DEDUCTION ELIGIBILITY ESTIMATOR

To calculate your estimated tax deduction, fill out the following:

[Print This Page](#)

Single System

Multiple Systems

* = Required information

ESTIMATE TAX DEDUCTION

- * **Building Type**
- * **Building Size**
 Square Footage sq. ft.
 Length ft. × Width ft.
- * **Number of Fixtures**
 Determine Based on Building Size
 Enter Number of Fixtures:
- Proposed System Description**
- * **Fixture Wattage of Proposed System**
 watts/fixture [I don't know my wattage](#)
- * **Is a [bi-level switch](#) installed?**
 Yes No Exempt
(Hotel and motel guest rooms, store rooms, restrooms and public lobbies are exempt.)
- * **Do the [light levels](#) satisfy [IESNA guidelines](#)?**
 Yes No

TO QUALIFY FOR A TAX DEDUCTION:
(Values are based on your building type and size.)

- ASHRAE/IESNA 90.1 (2001) Building Limit: 0.30 watts / sq. ft.
- To be 25% below ASHRAE/IESNA 90.1, building lighting power density must be less than: 0.22 watts / sq. ft.
- Fixture wattage must be less than:

For the maximum tax deduction (\$0.60 / sq. ft.)

- Fixture wattage must be less than:

[Calculate My Tax Savings](#)

Financial Incentives Database of Programs

DSIRE™
Database of State Incentives for Renewables & Efficiency

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

IREC
INTERSTATE RENEWABLE ENERGY COUNCIL

NORTH CAROLINA SOLAR CENTER

Home | Glossary | Links | FAQs | Contacts | About Us |

DSIRE SOLAR
solar policy information

DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is an ongoing project of the N.C. Solar Center and the Interstate Renewable Energy Council.

Choose one or both databases:
 Renewable Energy Energy Efficiency

Federal Incentives

Resources

- RPS Data
- Summary Maps
- Summary Tables
- Library
- Search
- What's New?

myDSIRE
customize DSIRE for your organization

Map of the United States showing state abbreviations: WA, OR, CA, NV, UT, AZ, NM, TX, AK, MT, ND, SD, NE, KS, MO, OK, AR, LA, MN, IA, IL, IN, MI, WI, OH, WV, VA, NC, SC, GA, AL, MS, TN, KY, PA, NY, VT, NH, ME, MA, RI, CT, NJ, DE, MD, DC.

U.S. Territories

www.dsireusa.org

Web and Organizational Resources

- Advanced Lighting Guidelines
 - All elements of lighting
- Design Lights Consortium
 - Solid-state lighting (only)
- EPA ENERGY STAR®
 - Technology neutral
- Lighting Facts ®
 - SSL Technologies



Images Courtesy of NREL
Solar PV and Light Fixture Integration

New Buildings Institute Advanced Lighting Guidelines

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



[Application Directory](#) | [Luminaire Directory](#) | [Glossary](#) | [Community](#) | [Contact ALG](#) | [About Advanced Buildings](#) | [Log in](#)

Search...

About ALG	Light & Vision	Health & Performance	Daylighting	Sources & Auxiliaries	Luminaires & Distribution	Lighting Controls	Design Considerations	Policies & Programs
---------------------------	------------------------------------	--	-----------------------------	---	---	-----------------------------------	---------------------------------------	---

Welcome to Advanced Lighting Guidelines! ALG Online is a 1,000+ page resource for the latest expert information on lighting technologies, industry best practices, and advanced design techniques. [Subscribe](#) now for full access to **premium content**, including design schematics and over 1,200 images.

Join us for a FREE ALG Online webinar and save 50% on an ALG Subscription! See how ALG Online can help designers, architects, engineers, facilities managers and others incorporate the most advanced, energy-efficient strategies and technologies into their projects.

ALG Online: an in-depth review of best practices in advanced lighting design

Live webinar: Tuesday, June 21 | 1-2:00 pm Central

Cost: FREE

[Reserve](#) your spot today!

[LOG IN](#)

[TAKE THE TOUR](#)

[GET FULL ACCESS TO ALG NOW](#)

ATTENTION ARCHITECTS & ENGINEERS

Offers authoritative data on energy-efficient lighting practices and integration with daylighting and other green building strategies.

[More for you »](#)

ATTENTION LIGHTING DESIGNERS

Keep up on the latest lighting technology for lamps, ballasts, and control strategies. Find a wealth of information on detailed design concerns and lighting applications.

[More for you »](#)

ATTENTION EDUCATORS & STUDENTS

Created and maintained by the industry's top thinkers, ALG Online can be used as both a teaching aide and a study guide.

[More for you »](#)

WHAT'S NEW

Check out the newest Advanced Buildings tool, the **Daylighting Pattern Guide (DPG)**, a free, interactive tool that illustrates how to create successful daylighting designs and presents information in a visual manner that appeals to designers as well as those with a limited background in lighting design.

[Take a look](#) at the DPG!

Receive email news from ALG Online. [Join our mailing list](#) to receive the latest information about high performance lighting design.

<http://www.algonline.org/>

DesignLights Consortium Qualified Product List



Energy Efficiency &
Renewable Energy

NEEPDLQCPL-1.xls [Read-Only] [Compatibility Mode] - Microsoft Excel

DESIGNLIGHTS CONSORTIUM (DLC)
 1 DESIGNLIGHTS CONSORTIUM (DLC)
 2 QUALIFIED PRODUCTS LIST (QPL)
 3 *This list is for the use of sponsors of the DesignLights Consortium (DLC) in operation of their commercial lighting programs.

Manufacturer Name	Brand Name	Model Number	Family Models	Product Category	Measured Luminaire Efficacy (lm/W)	Measured Wattage (W)	Measured Light Output (l)	Rated Lifetime (hours)
Acuity Brands Lighting	Holophane	LEDG-120-35-4K-AS-X-L3-XXXX	NA	Outdoor PoleArm-mounted Area and Roadway Luminaires	68.8	128	8803	80000
Acuity Brands Lighting	Holophane	LEDG-120-35-4K-AS-X-L3-XXXX	LEDG-120-35-5K-AS-X-L3-XXXX	Outdoor PoleArm-mounted Area and Roadway Luminaires				
Acuity Brands Lighting	Holophane	LEDG-120-35-4K-AS-X-L3-XXXX	LEDG-120-35-6K-AS-X-L3-XXXX	Outdoor PoleArm-mounted Area and Roadway Luminaires				
Acuity Brands Lighting	Holophane	LEDG-072-35-4K-AS-X-L2-XXXX	NA	Outdoor PoleArm-mounted Area and Roadway Luminaires	69.0	79.1	5457	
Acuity Brands Lighting	Holophane	LEDG-036-53-4K-AS-X-L2-XXXX	NA	Outdoor PoleArm-mounted Area and Roadway Luminaires	62.9	60.4	3798	
Acuity Brands Lighting	Lithonia Lighting	QLW14	NA	Outdoor Wall-Mounted Area Luminaire	54	26.45	1436	74773
Acuity Brands Lighting	Holophane	WFL-6K-070-AS-X-LE-S / X = Housing Color	NA	Outdoor PoleArm-mounted Decorative Luminaires	64.1	70.5	4517	96000
Acuity Brands Lighting	Holophane	PUL-070--5K-AS-B-L3-S	NA	Outdoor PoleArm-mounted Decorative Luminaires	71.4	70.7	5046	88000
Acuity Brands Lighting	Holophane	AUL-070-6K-AS-B-L3-S	NA	Outdoor PoleArm-mounted Decorative Luminaires	65.7	70.5	4631	91000
Acuity Brands Lighting	Holophane	MPL1104KASB4	NA	Outdoor PoleArm-mounted Decorative Luminaires	72.5	110	7971	75498
Acuity Brands Lighting	Holophane	MPL1104KASB4	MPL115KASB4	Outdoor PoleArm-mounted Decorative Luminaires				
Acuity Brands Lighting	Holophane	MPL1104KASB4	MPL116KASB4	Outdoor PoleArm-mounted Decorative Luminaires				
Acuity Brands Lighting	Holophane	LEDG-120-53-4K-AS-X-L3-XXXX	NA	Outdoor PoleArm-mounted Area and Roadway Luminaires	64.5	196.2	12660	65000
Advance Electronic Concepts	RCLF	RCLF-60-3500	NA	Refrigerated Case Lighting	49.6	22.21	235.6lmft	50000
Advance Electronic Concepts	RCLF	RCLF-60-3500	RCLF-60-4000	Refrigerated Case Lighting				
Advance Electronic Concepts	RCLF	RCLF-60-3500	RCLF-60-4500	Refrigerated Case Lighting				
Advance Electronic Concepts	RCLF	RCLF-60-3500	RCLF-60-5000	Refrigerated Case Lighting				
Albeo Technologies	Albeo	LS-B144-010C0	NA	Parking Garage Luminaires	67.1	55	3690	80000
Albeo Technologies	C-series	LS-B2P3-02AC0-C79	NA	High-bay and Low-bay fixtures for Commercial and Industrial Buildings	69.1	165.5	11432	100000
Albeo Technologies	Albeo	LS3-HQ2450-U21C00-17	NA	Fuel Pump Canopy	76.5	110	8412	100000
Albeo Technologies	Albeo	LS3-HQ2450-U21C00-17	LS3-HQ2450-38t000-17	Fuel Pump Canopy				
Albeo Technologies	Albeo	LS3-HQ2450-U21C00-17	LS3-HQ2450-48t000-17	Fuel Pump Canopy				
Albeo Technologies	Albeo	LS3-HQ2450-U21C00-17	LS3-ST2450-U2t000-14	Fuel Pump Canopy				

QPL Sheet1

<http://www.designlights.org/solidstate.manufacturer.overview.php>

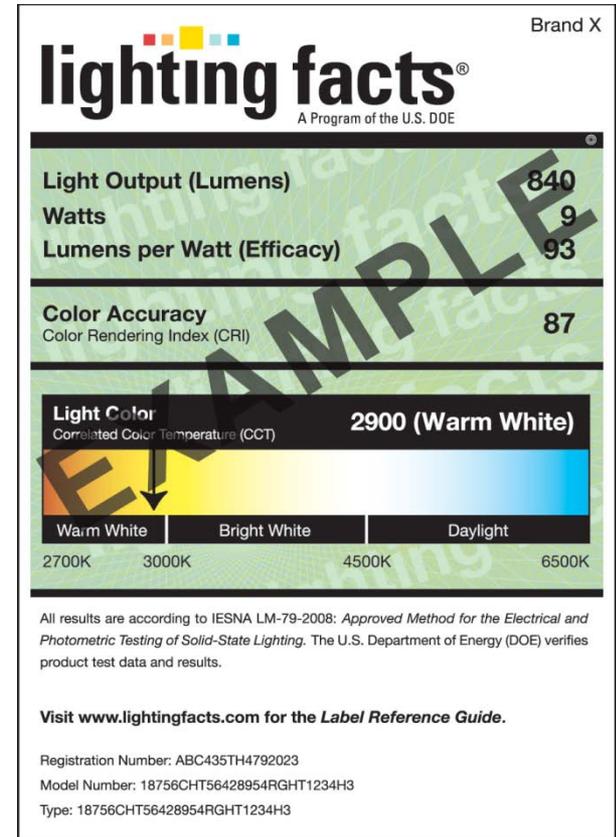
- New luminaires specification (v.1.0)
- Qualify Residential Light Fixture or SSL Luminaire specification until 9/15/2011
- Technology neutral
- Mostly residential luminaires
- Commercial categories
 - Accent lights
 - Downlights
 - Under cabinet task lighting
 - Portable desk task lighting



Image Courtesy of EPA

http://www.energystar.gov/index.cfm?c=new_specs.luminaires

- Voluntary program for light-emitting diode (LED) products
- Developed by DOE and the Next Generation Lighting Industry Alliance (NGLIA)
- Label provides a summary of characteristics, analogous to a nutrition label
 - Light output (lumens)
 - Input power (watts)
 - Efficacy (lumens per watt)
 - Color Rendering Index (CRI)
 - Correlated Color Temperature (K)



www.lightingfacts.com

Lighting Facts® Products Search Tool

Show only fixture type:

Light Output between and lm

Watts between and W

Lumens per Watt between and lm/W

Color Accuracy (CRI) between and (CRI)

Light Color (CCT) between and K

102
Products Match Your Criteria

Search Within Your Criteria:

- Searchable product listing
- Product snapshots for market characterization
- Manufacturers must test per IES LM-79
 - See website for discussion of the similar FTC label

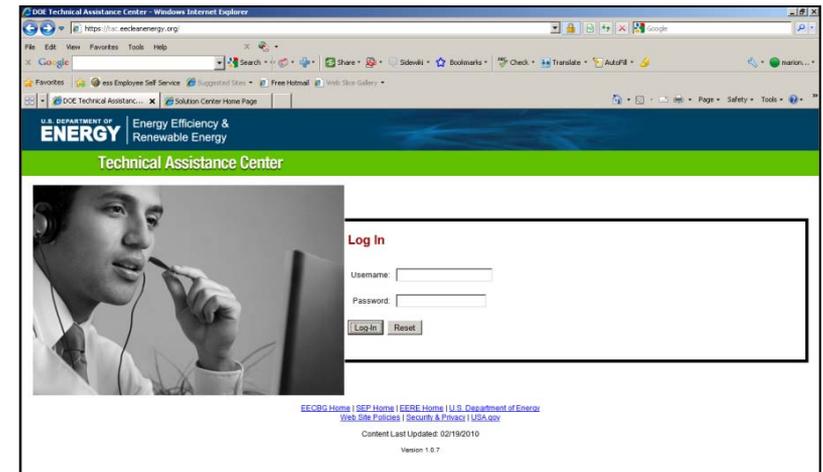
www.lightingfacts.com

We encourage you to:

1) Explore our online resources via the [Solution Center](#)



2) Submit a request via the [Technical Assistance Center](#)



3) Ask questions via our call center at 1-877-337-3827 or email us at solutioncenter@ee.doe.gov

Please join us again:

For the most up-to-date information
and registration links

please visit the Solution Center webcast page

www.wip.energy.gov/solutioncenter/webcasts

Thank you for joining us today!

Today's Presenter: Michael Myer, PNNL, Energy and Environment
Directorate, michael.myer@pnl.gov, 781-862-2321

DOE TECHNICAL ASSISTANCE CONTACTS

VEIC: Dan Quinlan, dquinlan@veic.org, 802-488-7677 (**Team Lead**)

MEEA: Steve Kismohr, skismohr@mwalliance.org, 312-784-7257

NEEP: Ed Londergan, elondergan@neep.org, 781-860-9177

NEEA: Elaine Blatt, eblatt@nwalliance.org, 503-688-5458

SWEEP: Curtis Framel, cframel@swenergy.org, 303-447-0078

SEEA: Scott Slusher, scott@seealliance.org, 480-239-4236

ACEEE: Eric Mackres, emackres@aceee.org, 202-507-4038

NRDC: Lara Ettenson, lettenson@nrdc.org, 415-875-6100

EFG: Richard Faesy, rfaesy@energyfuturesgroup.com, 802-482-5001