

Lighting Energy Efficiency in Parking (LEEP) Campaign

Learn how you can take the LEEP!

LEEP



High Efficiency Parking Lighting for Federal Agencies: The Time is Now to Join LEEP and Get the Resources You Need

Presenters

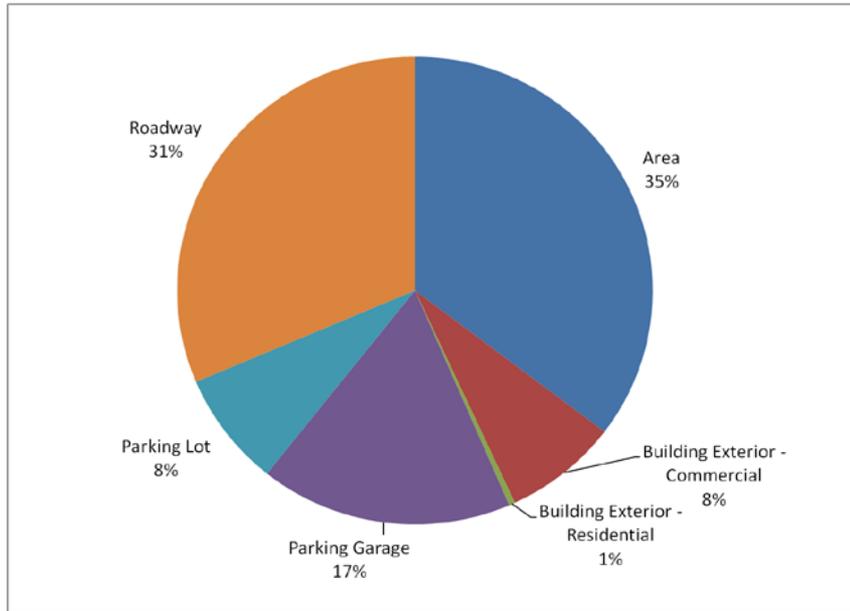
Jeff McCullough, Pacific Northwest National Laboratory

Marci Sanders, D&R International

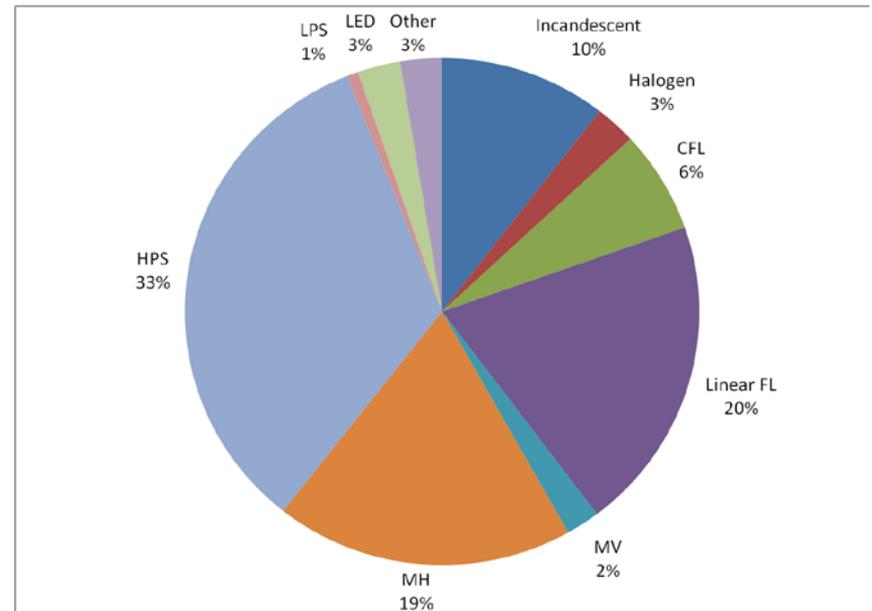
March 25, 2014

- 1. Exterior Lighting – The Time is Now**
 - Energy savings potential
- 2. Federal Requirements for Purchase of Energy Efficient Products**
 - Exterior lighting applications covered
 - FEMP Designation
- 3. Lighting Energy Efficiency in Parking (LEEP) Campaign**
 - Resources for federal agencies
 - How to Join as a Participant or Supporter
- 4. LED Lighting Facts[®] Tour**
- 5. Where to find more information**
- 6. Questions**

Estimated Federal Outdoor Lighting Energy Use by Application (Total 5.0 TWh)



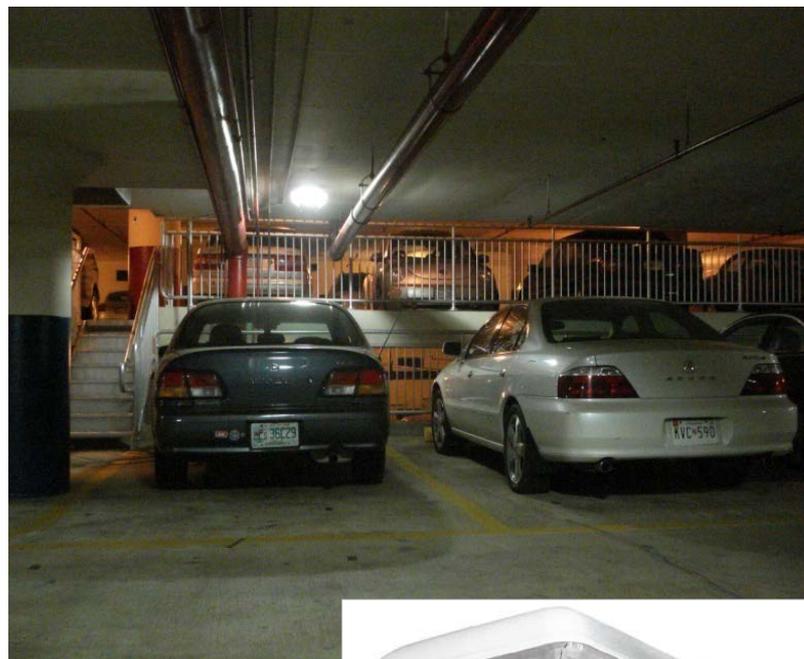
Federal Sector Outdoor Lamps by Technology (total 6.6 million lamps)



Source: Analysis of Outdoor Solid-State Lighting Potential at Federal Sites: Technical Support Document (PNNL-21458, August 2012)

US Department of Labor Building, Washington, DC

- Integral occupancy sensor dims fixture to 10% power
- Initial minimum horizontal illuminance increased 21%; average decreased 53%
- 55% installed wattage reduction in high state; 95% reduction in low
- ~80% kWh energy savings expected, includes dimming
- 1:1 replacement
- ~8 year simple payback (for retrofit), ~5 year for new



Source: PNNL

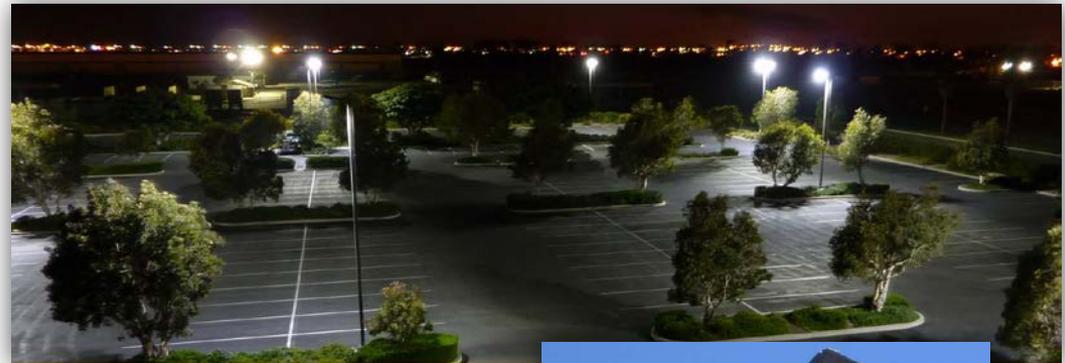
LED lighting installed in the parking garage of the Frances Perkins Building, U.S. Department of Labor headquarters, Washington, D.C.



Close-up of Philips Wide-Lite VizorLED

NAVFAC Engineering Service Center at Port Hueneme, CA

- Light levels increased by 18% in dimly lit areas
- Lighting power was reduced 74% to 2.81 kW from 10.88 kW
- Illumination distribution more uniform
- Higher CCT: 6500K for LED compared to 2000K for HPS
- Instant on – no strike or re-strike delay
- Longer lamp life; an expected 50,000 hours for the LEDs and driver versus 24,000 hours average for HPS



New LED parking area lights at the NAVFAC Engineering Service Center at Port Hueneme provide high quality, evenly distributed light.



Close up view of new LED luminaires atop an existing light pole.

Source: PNNL

CBP Yuma, AZ US/Mexico Border

- 7.2 miles along US/Mexico border
- Existing: 1000W metal halide floods
 - 1180W including ballast
 - CCT: ~4400K
 - ~12,000 hour lamp life
- Proposed: 315W LED
 - CCT: 4000K
 - 60,000 hours to L₉₀ (90% light output)
- Energy savings alone reduced 73%
- Benefits
 - Illumination distribution more uniform
 - Instant on – no strike or re-strike delay



Source: Eaton Energy Solutions



Close up view of new LED luminaires atop an existing light pole.







Multiple laws, Executive Orders, and the Federal Acquisition Regulations have established a robust set of requirements that:

Federal purchasers MUST buy, specify, and contract for ENERGY STAR[®], FEMP-designated, and low standby products

Suppliers must provide only compliant products (look for FAR clause 52.223-15 in your contract)

References:

- Energy Independence and Security Act of 2007 (EISA)
- Energy Policy Act (EPAAct) of 1992 and 2005
- Executive Orders 13221, 13423 & 13514
- Federal Acquisition Regulation (FAR 23.2 and FAR 52.223-15)

Heating & Cooling (Space & Water)

Lighting

IT & Electronics

Food Service

Appliances

Other



Lighting Components

[Fluorescent Ballasts](#)

[Fluorescent Tube Lamps](#)

Light Bulbs:

[Compact Fluorescent \(CFLs\)](#)

[Light Emitting Diodes \(LEDs\)](#)

[Decorative Light Strings](#)



Lighting Systems

Light fixtures:

[Commercial](#)

[Residential](#)

[Exterior](#)

[Fluorescent Luminaires](#)

[Industrial \(High Bay\)](#)

http://www1.eere.energy.gov/femp/technologies/eep_purchasingspecs.html

- FEMP-designated Efficiency Requirements (ER) established for 6 exterior lighting categories:

Category	Luminaire Efficacy Rating (LER)
Outdoor wall-mounted luminaires	60
Outdoor pole/arm-mounted area and roadway luminaires	65
Outdoor pole/arm-mounted decorative luminaires	65
Fuel pump canopy luminaires	70
Bollards	35
Parking garage luminaires	70

- These applications cover 97% of Federal exterior lighting*
- Does not overlap with ENERGY STAR® covered products
- Search “portal” developed within DOE’s Lighting Facts® Program.

*Based on data from PNNL’s Federal Market Assessment for Exterior Lighting for FEMP

The LEEP Campaign:

- A recognition and guidance program to support high efficiency lighting for parking facilities
- Focus on barriers to adoption and resource gaps
- Offers specifications, tools, resources developed by Team and others rolled into larger Campaign
 - Free limited technical assistance
- Organized by:
 - Building Owners and Managers Assn. International (BOMA)
 - International Facility Management Assn. (IFMA)
 - Green Parking Council (GPC)
- Technical Support from:
 - Better Buildings Alliance (U.S. DOE)
 - Federal Energy Management Program (FEMP)
- Over 100 Participants (sites)
- Over 100 Supporters
 - Utilities, efficiency groups, manufacturers, etc.
- Federal entities are encouraged to join!



The LEEP Campaign – Phase 1

- First round of awards - IFMA Facility Fusion Conference & Expo, April 15, 2014
- LEEP Phase 1 total installed/planned sq ft is over 270M sq ft.
 - Goal: 100M sq ft.
- LEEP Award submissions received from 21 organizations represents:
 - over 160M sq ft of installed parking space;
 - about **45 million kWh/year** (or ~155 billion Btu of site energy) saved;
 - about **500,000** parking spaces in about **600 parking facilities**; and
 - estimated energy savings of 56% on average, with some sites reaching over 80%.
- LEEP Award winners in all 12 categories
- Next round of awards – late June 2015



The LEEP Campaign – Phase 1 Awards Retrofit

- Absolute savings - parking lot
- Absolute savings - parking structure
- Greatest % savings - parking lot
- Greatest % savings - parking structure

New Construction

- Absolute savings - parking lot
- Absolute savings - parking structure
- Greatest % savings - parking lot
- Greatest % savings - parking structure

General

- Best use of controls
- Absolute number of sites
- Greatest percentage of portfolio
- Greatest overall savings kWh



Lighting Energy Efficiency in Parking (LEEP) Campaign (cont.)

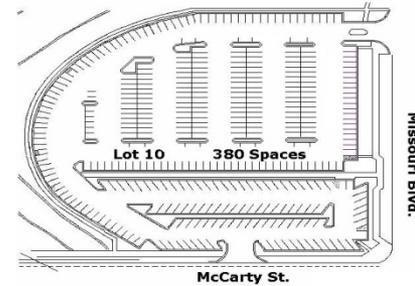
A variety of resources available from www.leepcampaign.org Visit the *For Federal Users* page



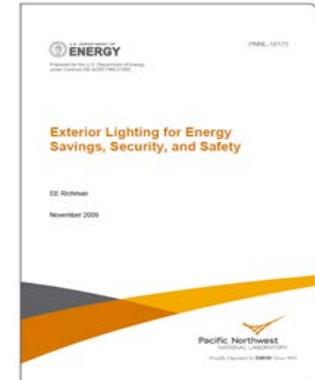
Case Studies



Specifications



Technical Assistance (limited)



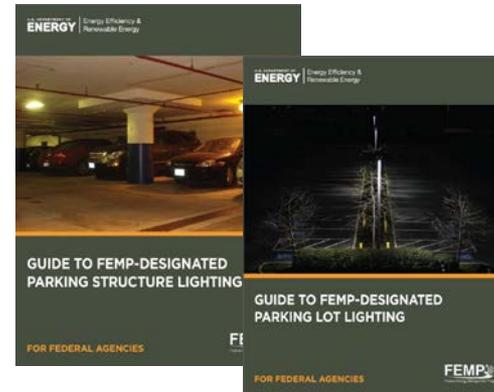
M&V guidance



Energy Estimator to compare against code

Utility	State	Technology	Product	Rebate Amount
Alliant Energy	IA	LED	Fixture	\$30
Alliant Energy	IA	Controls	Occupancy Sensor	\$20

List of utility incentives



Design Vignettes



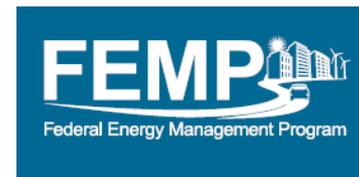
Lighting Energy Efficiency in Parking (LEEP) Campaign (cont.)

Over 100 LEEP Campaign Participants (as of March 2014)

ABM Energy	Cushman & Wakefield	MGM Resorts International	The Hermitage Centre
ABM Facility Services	Denver Office Park / CBRE	Midwest Moving & Storing	The Kroger Co.
AGC Banquet & Event Center	Dept. of Defense, Joint Base San Antonio	Miller-Valentine Group	ThedaCare
Alexandria Real Estate Equities, Inc.	Dept. of Veterans Affairs, Perry Point, MD	MN National Guard	Tower Companies
Allentown Parking Authority	Evolvelectric	Morlin Asset Management	Town of Amherst
American Realty Advisors	Ford Motor Company	Newmark Grubb Knight Frank	Town of Mountain Village
Arby's Restaurant Group	Forest City Enterprises Inc.	Parmenter Realty Partners	U.S. Army Reserve Parks Reserve Forces Training Area
AT&T	Franklin Resources Inc	Perry CSD	U.S. Army - Dugway Proving Ground
Blue Hill Partners	Gaylord Nat Resort & Convention Ctr	Point Park University	Union Station
Bradford Exchange	Georgia Building Authority	Prince William County Govt., Department of Public Works	University of California at Irvine
Brookfield Office Properties	Groupe Pacific	Prologis L.P.	University of Colorado Health
Brookshire Brothers	Grubb Ventures	Providence Heath & Services	University of Maryland Medical Center
Bruce Wayne Kubena	Hammerschlag & Co., Inc.	Prudential Real Estate	University of Minnesota - Parking and Transportation Services
CBRE for Regions Bank	Hines	PTP Management, Inc.	University of Pennsylvania
CC Frost Properties, LTD	Horizon Solutions LLC	Regency Centers	University of South Florida
CentraCare Health System	ibx lighting	Reit Management & Research LLC	Univ. of Pittsburgh Medical Center)
City of Melrose	JBG Companies	Santa Barbara County	US Air Force - Lackland, AFB
City of San Jose, Dept. Transp.	Jones Lang LaSalle	Shelor Motor Mile	Village of Great Neck Plaza
CLTC	Julin Realty Services, LLC	Standard Parking	Von Braun Center
Compass Properties, LLC	Kimco Realty Group	State of Missouri	Walmart
Connecticut General Assembly	Marine Corps Base Quantico (MCBQ)	Sumner School District	Wells Fargo Insurance USA
Cox Enterprises Inc.	MC Realty Group LLC	Supervalu, Inc.	Wyndham
Crescent Real Estate Equities	MD Anderson Cancer Center	TES Engineering	

Collaborative development effort

- DOE Municipal Solid-State Street Lighting Consortium
<http://www1.eere.energy.gov/buildings/ssl/consortium.html>
- Clinton Climate Initiative (CCI)/C40
<http://www.clintonfoundation.org/main/our-work/by-initiative/clinton-climate-initiative/programs/c40-cci-cities.html>
- Federal Energy Management Program (FEMP)
<http://www1.eere.energy.gov/femp/>



Retrofit Financial Analysis Tool (cont.)

retrofit-financial-analysis-tool_v1.1.01.xlsx [Protected View] - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

C11 Scenario Description (optional)

Input Page

Key

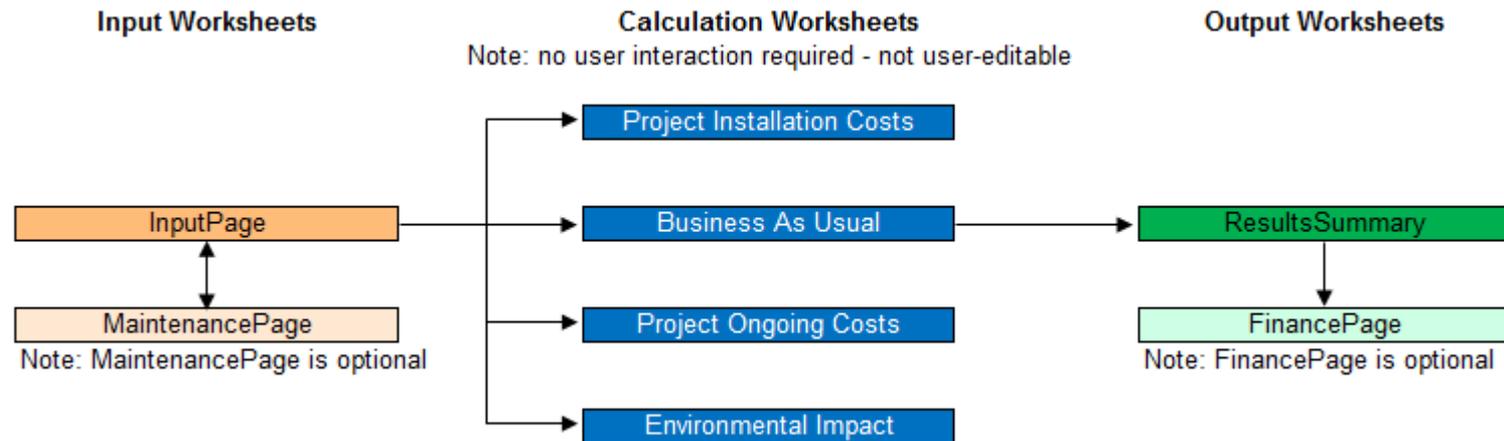
White Cell, Bold Text: Value Title	Orange Cell: Input Value	Advanced Options: Disabled
	White Cell: Calculation or Constant	
	Dark Grey Cell: Disabled Feature	

Project Inputs

Scenario Description (optional)		Describe scenario characteristics.
Tax, Electricity, and Labor Costs		
Sales Tax (%)		Set the tax rate applied to equipment purchased for new installation.
Electricity Rate (\$/kWh)		Set the local cost of electricity per kilowatt-hour for lighting system.
Annual Change in Electricity Cost (%)		Set the annual rate of change for local Electricity Cost. For assistance, see link: Energy Escalation Rate Calculator
Installation Vehicle Rate (\$/hr)		Set the total hourly cost of all vehicles used for installation of new lighting equipment.
Annual Change In Vehicle Rate (%)		Set the annual rate of change for Vehicle Rate. For assistance, see link: CBO Consumer Price Index forecast
Installation Labor Rate (\$/hr)		Set the total hourly cost of all labor used for installation of new lighting equipment.
Annual Change In Labor Rate (%)		Set the annual rate of change for Installation Labor Rate. For assistance, see link: CBO Employment Cost Index forecast
Finance Nominal Discount Rate (%)		Set the nominal rate at which future cash flows are discounted to the Present Value. This should reflect the cost of capital.
Greenhouse Gas Emissions		
Emissions Factor (kg CO ₂ e/kWh)	0.552	Set the local emissions factor for electricity. For assistance, see link: EPA eGRID Power Profiler
Project Overhead and Implementation		
Project Overhead Labor (persons)		Set the number of staff needed to plan and manage a lighting retrofit project.
Project Overhead Labor Rate (\$/hr)		Set the average hourly cost of labor for Project Overhead Labor.
Project Overhead Work Year (hrs/person/yr)		Set the average number of hours per staff member that Project Overhead Labor will work on the project during each project year.
First Year of Implementation	1	Indicates the first year in which new equipment is installed (currently fixed at 1).
Last Year of Implementation		Indicate the last year in which new equipment is installed (enter integer value from 1 to 30).

Structure and flow of tool

- Input page
- Maintenance page (optional)
- Results summary
- Finance page (optional)
- Calculation worksheets (no user interaction; for information only)



Tool purpose and background

- What it is: Excel-based analytical tool to evaluate costs and benefits of conversions to more efficient lighting technologies
- What it's not:
 - intended for design assistance
 - a database of lighting technologies' characteristics
- May be used to analyze any street or parking facility lighting technology (LED or otherwise)
- Detailed analysis provides numerous outputs, including:
 - Annual energy and energy-cost savings
 - Annual maintenance savings
 - Annual greenhouse gas reductions
 - Net present value, internal rate of return, simple payback
- Original version (v1.0) of tool released in February, 2012. Version 1.1 released in early August, 2013. Version 1.1.01 posted on 8/21/2013.

- **Retrofit Financial Analysis Tool** web page:
<http://www1.eere.energy.gov/buildings/ssl/financial-tool.html>
 - Zip file including two versions of tool (with and without sample data)
 - Document providing guidance for using the tool (**important**)
 - Release notes document, describing changes since initial, 2012 release
 - Presentation/webinar materials
 - Questions about the Retrofit Financial Analysis Tool can be sent to MSSLC@seattle.gov

- The Basics:
 - www.lightingfacts.com
 - Advanced product search for all SSL product types
 - Easy search interface, downloadable lists, comparisons
 - Driven by submissions from manufacturers—data verified by LED Lighting Facts team
 - 1,000 product submitted every month!
 - “Just the Facts”—performance data, backed by test reports...no thresholds
- FEMP-designated Portal: Powered by LED Lighting Facts
 - www.lightingfacts.com/LFPowered/FEMP
 - Same advanced product search functionality and interface
 - Displays ONLY products that meet FEMP guidance that are generated by LED Lighting Facts dynamic database



From LED Lighting Facts® to...

FEMP Portal Powered by LED Lighting Facts

LED Lighting Facts® Products

Welcome to the LED Lighting Facts Product list! This is a complete list of valid state lighting products that have received an LED Lighting Facts label. The list also includes the verified performance information for each product.

Once you have narrowed your search criteria, click on the search button. You can further refine your search by clicking on the section headers.

Can't find a product? If the product is no longer available in the market, it may have been archived. Search the Product Archive List for more information.

9630 PRODUCTS

The Product Type and Product Category criteria are currently available as search criteria, and give you an overview to suggest the levels to include the other products. This page will provide greater description and searchability.

Product Type	Product Categories	Use Location	Mounting Base	Subcategory
<input type="checkbox"/> Luminaire <input type="checkbox"/> Lamp <input type="checkbox"/> Retrofit Kit	Please select a Product Type to narrow by Product Category.	Please select a Product Type to narrow by Use Location.	Please select a Product Type to narrow by Mounting Base.	Plans are underway to include this subcategory.

Additional Product Metrics (CLICK TO COLLAPSE)

Power Factor	0.91 to 1.00	Zone Lumen Density (0-47)	5 to 100
Input Voltage	115V to 480	Zone Lumen Density (50-97)	5 to 100
UV	0 to 100	Zone Lumen Density (100-157)	5 to 100
IR	0 to 100	Zone Lumen Density (158-187)	5 to 100
Total Harmonic Distortion	0 to 144	Spacing Criteria (0-100)	1.00 to 1.19
Beam Angle	0 to 327.4	Spacing Criteria (100-270)	1.00 to 1.24
Center Beam Candelabra	24.10 to 10011		

Search Products By Keyword: **Update Results**

0 TOTAL MATCHING PRODUCTS [Download Full List](#)

Welcome! Federal Energy Management Program Acquisition Guidance for Lighting Products

Federal Energy Management Program (FEMP) Acquisition Guidance

Covered Product Category: Exterior Lighting

FEMP provides acquisition guidance and Federal efficiency requirements across a variety of product categories, including exterior lighting. Federal laws and executive orders mandate that agencies meet these efficiency requirements in all procurement and acquisition actions that are not specifically exempted by law.

The list is pre-populated with LED products that have been verified by the LED Lighting Facts program and meet the FEMP-designated performance requirements for 6 categories of exterior lighting products used for general illumination.

1937 Total Products

Products Details

FEMP-Designated Product Category	Lumens	Total Product Qty
Exterior	32	36
Full Pump Cavity Luminaire	70	159
Fluorescent Luminaire	70	239
Outdoor Flood Area Mounted Area Mounted Luminaire	65	1140
Outdoor Wall Mounted Luminaire	60	351
Outdoor Flood Area Mounted Area Mounted Luminaire	65	37

Product Count Timeline

Jan 2015, Mar 2015, May 2015, Jun 2015, Aug 2015, Oct 2015

Customize Your Product Search

The FEMP Acquisition Guidance Product List can be filtered using the additional search criteria below. Once you have narrowed your search criteria, click on the Update Results button. The results or full list can also be downloaded to an excel file.

POWERED BY LED Lighting Facts®

The FEMP Acquisition Guidance Product List is Powered by LED Lighting Facts. The products that appear in this list are generated from the LED Lighting Facts product database and have been verified by the LED Lighting Facts program.

Product Category (CLICK TO EXPAND)

LED Lighting Facts Label Metrics (CLICK TO EXPAND)

Additional Metrics (CLICK TO EXPAND)

Qualifications (CLICK TO EXPAND)

Search Products By Keyword: **Update Results**

1937

TOTAL MATCHING PRODUCTS

Sort By: Organization Brand Model Number **Date Updated** [Date Updated](#) **CURRENTLY VIEWING 20 OF 1937**

Philips Lighting Approved 10/9/2013 Luminaire - Descriptive BRAND: Philips HPS MODEL: VLT1434825VNA	Santa & Cole Approved 10/9/2013 Luminaire - Area/Recessed BRAND: Santa & Cole MODEL: RAHA RE	Philips Lighting Approved 10/9/2013 Luminaire - Descriptive BRAND: Philips HPS MODEL: VLT1434825VNA	jiangsu yongjiong ... Approved 10/9/2013 Luminaire - Cavity BRAND: YJ MODEL: YJLJ5205H-03V1P
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Federal Requirements for Procurement of Energy-Efficient Products

- <http://energy.gov/eere/femp/articles/federal-requirements-procurement-energy-efficient-products>

FEMP Covered Product Category: Exterior Lighting

- <http://energy.gov/eere/femp/articles/covered-product-category-exterior-lighting>

LEEP Campaign – Resources for federal users

- <http://www.leepcampaign.org/for-federal-users.html>

Join the LEEP Campaign as a Participant

- <http://www.leepcampaign.org/join-as-participant.html>

Join the LEEP Campaign as a Supporter

- <http://www.leepcampaign.org/join-as-supporter.html>

Find Qualified Products via LED Lighting Facts

- <http://www.lightingfacts.com/LFPowered/FEMP>

Municipal Solid State Street Lighting Consortium

- <http://www1.eere.energy.gov/buildings/ssl/consortium.html>

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Presentation and video will be available for download soon – visit
http://apps1.eere.energy.gov/femp/training/course_detail_live.cfm?CourseDateId=2592