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

Taking the LEEP: Experience with LEDs in Parking Lots and Structures





LIGHTFAIR International

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ABOUT LEEP

- Lighting Energy Efficiency in Parking (LEEP) Campaign
  - www.leepcampaign.com
  - #LEEPCampaign

- Joint campaign organized by BOMA, Green Parking Council, IFMA, International Parking Institute, and DOE's Better Building Alliance

- Install or commit to install energy efficient lighting and controls in parking lots, structure, garages, or ramps
  - Year 1 goal: 100 million square feet (surpassed)
  - Year 2 goal: 500 million square feet (cumulative to year 1 values)

About LEEP – Savings values

- Award winners installed LEDs, fluorescent, metal halide, induction, and lighting controls to save energy

- 21 organizations submitted materials for awards:
  - 50% of installed sites use LEDs
  - Over 160 million square feet installed
  - Representing 500,000 parking spaces
  - 500 parking sites (lots, structures, garages, ramps)
  - 44 million kWh annually saved
  - Savings average 50% with many sites saving over 80% energy savings

LEEP Campaign Award Winning Parking Lots (using LEDs)

LEEP Award Winner: Marine Corps Base Quantico

- Location: Virginia
- Square Feet: 3.8 million
- 101 total parking lots
- Total kWh saved: 459, 346 / year
- Key Features: Conversion from HID (MH, HPS, and even some MV) to low wattage LED
- Award: Highest % energy savings in a retrofit parking lot

	Existing	New	Portion Savings
Energy Use	6,570 kWh	968 kWh	85%
Lighting Power Density (LPD)	0.14	0.02	---

LEEP Award Winner: Walmart

- Location: Across the country
- Square Feet: 40+ million square feet
- 117 total parking lots (submitted for awards)
- Total kWh saved: 15+ million / year
- Key Features: Conversion from HID (MH & HPS) and new construction to lower wattage LED
- Awards:
  1. Highest % energy savings in a retrofit parking lot
  2. Highest % energy savings in a new construction parking lot
  3. Highest absolute energy savings in a new construction parking lot
  4. Greatest overall energy savings portfolio wide

	Existing	New	Average Energy per Site
Energy Use	212,490 kWh	81,791 kWh	130,699 kWh
Lighting Power Density (LPD)	0.10	0.04	---

LEEP Award Winner: Regency Centers

- Location: Santa Ana, CA
- Square Feet: 75,000+
- 259 parking spaces
- Key Features: Conversion from HID to lower wattage LED
- Award: highest % energy savings at a retrofit parking lot

	Existing	New	Percentage Savings
Energy Use	128,578 kWh	15,485 kWh	88%
Lighting Power Density (LPD)	0.39	0.14	---

LEEP Campaign Award Winning Parking Structures (using LEDs)

LEEP Award Winner: MGM Detroit Grand

- Location: Detroit, MI
- Square Feet: 2.6 million
- Parking Spaces: 5,000+
- Key Features: metal halide to LED
- Award: Highest absolute annual energy savings in a retrofit at a single parking structure

	Existing	New	Energy Savings
Energy Use	4,993,796 kWh	1,015,248 kWh	3,978,548 kWh
Lighting Power Density (LPD)	0.25	0.05	---

LEEP Award Winner: ThedaCare

- Location: Appleton, WI
- Square Feet: 126,000
- Parking Spaces: ≈ 400
- Key Features: metal halide to LED
- Award: Highest % energy savings in a retrofit at a single parking structure

	Existing	New	Portion Savings
Energy Use	179,124 kWh	24,734 kWh	86%
Lighting Power Density (LPD)	0.22	0.03	---

LEEP Award Winner: Univ. of Minnesota

- Location: Minneapolis, MN
- Square Feet: ≈ 25,000
- Parking Spaces: ≈ 75
- Key Features: Conversion from HPS to LED + controls
- Award: Highest % energy savings in a retrofit at a single parking structure

	Existing	New	Portion Savings
Energy Use	83,991 kWh	8,006 kWh	90%
Lighting Power Density (LPD)	0.39	0.12	---

LEEP Award Winner: JBG Companies

- Location: Rockville, MD
- Square Feet: 600,000+
- Parking Spaces: ≈ 2,000
- Key Features: New construction using LEDs+ controls
- Award:
  1. Highest absolute annual energy savings in new construction parking structure
  2. Highest % energy savings in a new construction parking structure

	Existing	New	Energy Savings	Portion Savings
Energy Use	783,379 kWh	251,257 kWh	5352,142 Kwh	84%
Lighting Power Density (LPD)	CODE	0.26	---	---

Key Lessons Learned

- Know your potential
  - # of parking space estimates range from 100 million – 2 billion
  - Decision makers vary
  - Although parking lots operate fewer hours, vastly more lots were retrofitted or installed than parking structures
- Installed lighting systems
  - Virtually all sites reduced wattage in new design
  - Switching to more efficient sources?
  - Modifying lighting needs / expectations?
  - Probably a combination of both
- Lighting controls
  - Sites not afraid to use or explore with controls (multiple types on some sites)
  - Mixture of stand alone and networked systems utilized
  - More information about systems needed to possibly predict controls savings

Things we saw across LEEP sites

- LED Parking Lots in Campaign:
  - 0.02 – 0.06 W/sf (way below energy code)
  - Occupancy sensor controls only used in some parking lots
- Mostly those that submitted for LEEP awards
  - Retrofit sites vastly more than new construction sites
  - Sites across the country
  - Ranged in size from 10s of thousands to many millions of square feet
- LED Parking Structures in Campaign:
  - 0.03 – 0.18 W/sf (significantly below energy code)
  - Multiple control systems used – daylight, occupancy sensor, and time clock controls

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