

Charting a Course to Energy Independence

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Niche Technologies

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FEMP Mission

to facilitate the Federal government's implementation of cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship



Niche Technology

- Defined as
 - ◆ Has a good payback
 - ◆ Savings may be small
 - ◆ Possibly few but likely some applications



Niche Technologies

- Centralized HID dimming
- Plug load controllers
- Occupancy-based temperature control
- GreenSwitch™



Centralized HID Dimming

- Centralized controller allowing the dimming of HID lighting without dimming ballasts
- Apply in areas with variable use patterns or areas that may be over lit
- Look for:
 - ◆ Lighting needs that change “after hours”
 - ◆ Lamps that experience high lumen depreciation
 - ◆ Areas that are over lit for current needs



Recommended Maintained Illuminance for Open Parking Areas

Level of Activity	General Parking and Pedestrian Area* Lux (Footcandles)	Vehicle Use Area* Lux (Footcandles)
High	10 (0.9)	22 (2)
Medium	6 (0.6)	11 (1)
Low†	2 (0.2)	5 (0.5)

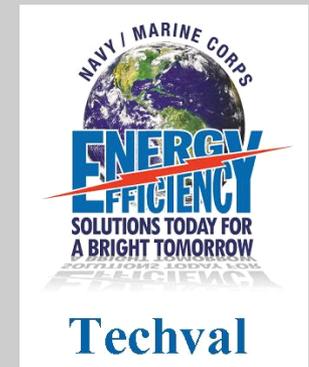
* Minimum illumination on pavement.

† Based on requirement to maintain security in areas where there is a low level of nighttime activity.

Source: IESNA Lighting Handbook: Reference and Application, 9th Edition, Figure 24-23.

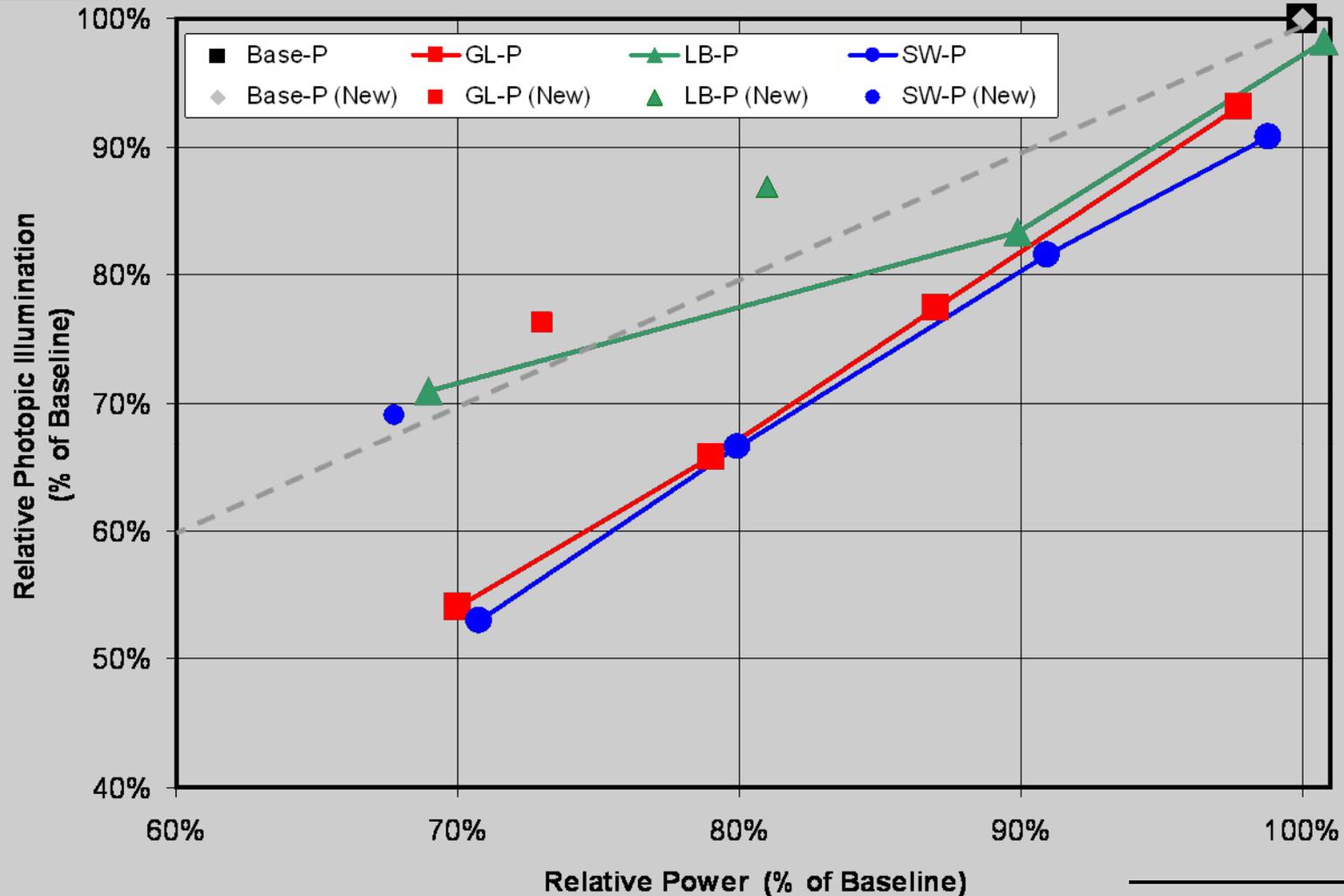


HID Dimming Demonstration



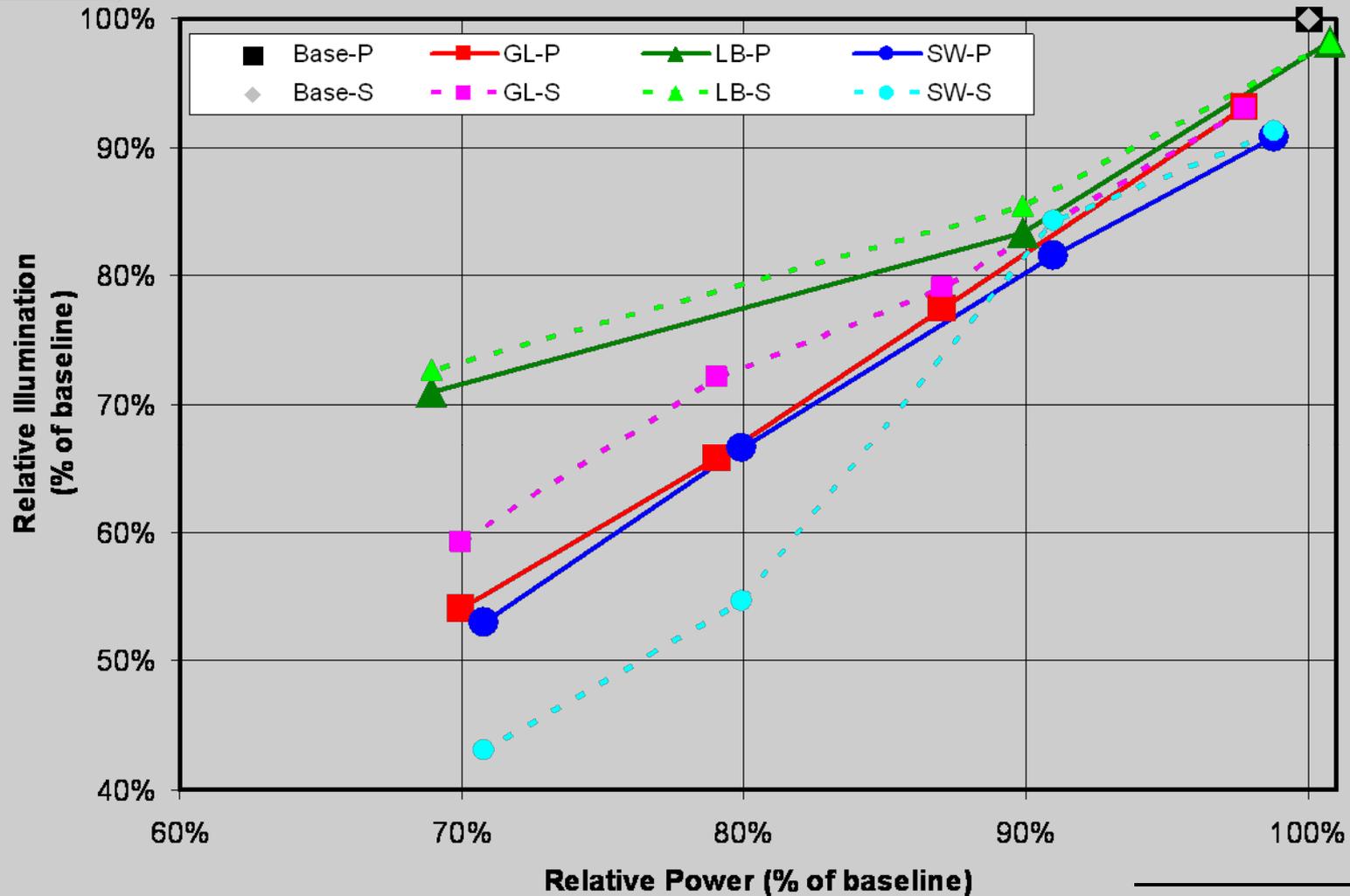


HID Dimming Results





Photopic/Scotopic Results





Plug Load Controllers

- Plug loads account for ever increasing energy consumption
 - ◆ Sometimes out-of-sight means out-of-mind
 - ◆ Even turned off, phantom-loads continue
- Plug load controllers can de-energize the system at the outlet
 - ◆ Saving more energy than turning it off
- Several different products in this market



Plug Load Controllers

- Technology used to de-energize plug loads either ‘after hours’ or when area is unoccupied
- Apply to many plug loads that do not experience problems with re-starting
- Some plug loads may need to be isolated



Images courtesy of
Hamilton Technology



Image courtesy of
USA Technologies



Image courtesy of
WattStopper

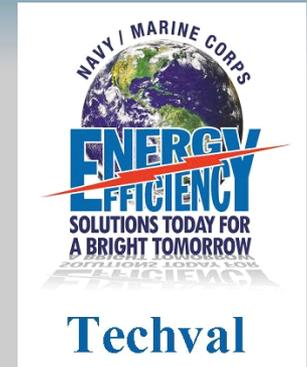


Plug Load Controller Demonstrations





Plug Load Controller Demonstrations



- Naval Base Ventura County, CA
 - ◆ Video arcade games at a diner (2)
 - ◆ Video arcade games at a bowling alley (5)
 - ◆ Toy-winning games at a bowling alley (2)
- Before/after demonstration
 - ◆ Baseline operation 24/7/365
 - ◆ Dual-outlet (15-Amp, 1875-Watt) 7-day digital programmable timer set for store business hours
 - ◆ Plug load controller with occupancy sensor set for 15-minute delay



Plug Load Controller Results

Energy (kWh/d)	ND1	ND2	BA1	BA2	BA3	BA4	BA7	BA11	BA12
Baseline	2.83	2.34	2.47	9.04	2.38	3.27	2.87	1.99	0.90
Timer	0.87	0.76	1.36	4.91	1.30	1.86	1.57	1.14	0.75
Sensor	0.67	0.45	1.61	6.85	1.50	2.13	0.68	1.25	0.60

Savings (% of Baseline)

Timer	69%	68%	45%	46%	45%	43%	45%	43%	17%
Sensor	76%	81%	35%	24%	37%	35%	76%	37%	33%

Simple Payback (yr)

Timer (Cost* \$60)	0.7	0.9	1.2	0.3	1.3	1.0	1.1	1.6	9.1
Sensor (Cost* \$120)	1.3	1.4	3.2	1.3	3.1	2.4	1.3	3.7	9.1

* Installed cost assumes one controller per device and \$40 for labor/installation.



Plug Load Controller Results

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Timer	0.87	0.76	1.36	4.91	1.30	1.86	1.57	1.14	0.75
Sensor	0.67	0.45	1.61	6.85	1.50	2.13	0.68	1.25	0.60
Repositioned Sensor				4.26	0.87	1.00	1.05		

Savings (% of Baseline)

Timer	69%	68%	45%	46%	45%	43%	45%	43%	17%
Sensor	76%	81%	35%	24%	37%	35%	76%	37%	33%
Repositioned Sensor				53%	63%	69%	63%		

Simple Payback (yr)

Timer (Cost* \$60)	0.7	0.9	1.2	0.3	1.3	1.0	1.1	1.6	9.1
Sensor (Cost* \$120)	1.3	1.4	3.2	1.3	3.1	2.4	1.3	3.7	9.1
Sensor** (Cost* \$120)				0.6	1.8	1.2	1.5		

* Installed cost assumes one controller per device and \$40 for labor/installation.

** Assumes savings from repositioned sensor.

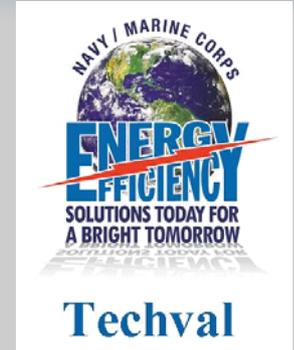


Occupancy-based Temperature Control

- Technology used to change thermostat control set points based on occupied/unoccupied status
- Apply to residential or hospitality facilities to reduce space conditioning energy
- Several different products in this market
- Both design and maintenance important



Occupancy-based Temperature Control Demonstration



- Control Technology
 - ◆ Passive infrared occupancy sensor
 - ◆ Door activated switch allows change in status
 - ◆ Wired system selected but wireless is an option
- Dormitory, NAS Oceana, VA
 - ◆ 3-wing, 3-story, 102-room dormitory w/BAS
 - ◆ Central chiller and district steam/heating hot water
 - ◆ Individual 4-pipe unit ventilators in each room with dedicated outdoor air system



Occupancy-based Temperature Control Results

- New temperature set points
 - ◆ Occupied 74°F summer/68°F winter
 - ◆ Unoccupied 82°F summer/65°F winter (+8°F/-3°F)
- Savings
 - ◆ 43,600 kWh/yr (12½%) cooling
 - ◆ 947 therms (2¼%) heating
- Cost
 - ◆ \$42,250 installed





GreenSwitch™



- Wireless control for home, office or hospitality
 - ◆ Light switches (including 3- and 4-way)
 - ◆ Outlets (single or dual control)
 - ◆ Programmable thermostats
- Technology allows the occupant to turn off lights, plug loads, and reset thermostats using a single master switch as they leave the area





Thanks to

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Questions?

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