PIER Lighting Technology
Candidates for 2008 Title 24

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Overview

• PIER Buildings Program has supported development of numerous technologies

• Today—summarize capabilities of the best Title 24 candidate lighting technologies

• Full “code analysis” not started
Integrated Classroom Lighting System (ICLS)

Overview

• High-performance lighting system
  ... saves energy & demand

• High-quality direct-indirect light
  ... happy users
Integrated Classroom Lighting System (ICLS)

Overview

- Commercially available
  ... as a system, currently from one supplier
  ... as components, from “anybody”
- No new technology
  ... “state of the shelf”
- Publicly available product specification
ICLS

Key Features

• Direct/indirect lighting
• “White” board lighting
  … functions like task lighting
• High-efficiency components
  … “super” T8 lamps
  … premium electronic ballasts
  … 96% reflectivity paint
ICLS

Key Features

• “A/V” mode for low-ambient use
  ... teacher control center

• Integrated occupancy controls

• 1-hour “quiet time” over-ride for tests
ICLS

Key Features & Benefits

• ~0.82–0.92 W/sq-ft connected load
• Additional savings from occupancy sensors
• ~$2.71/sq-ft for basic system
  ... vs. ~$2.86/sq-ft for standard troffers
• High-quality lighting
  ... very happy users
ICLS

Code Opportunity

• Reduce allowable classroom lighting power density
  ... 1.0 W/sq-ft clearly attainable (w/o controls credits)

• Require occupancy sensors
Bi-level Stairwell Fixtures

Overview

• Low light level during unoccupied periods
• Full light level during occupied periods
• Meets code requirements
Bi-level Stairwell Fixtures

Overview

• Commercially available from three manufacturers
  ... LaMar, Daybrite, Cooper

• LaMar details
  ... Relatively new product... released ~2003
  ... Cost ~$150
Bi-level Stairwell Fixtures

Key Features

• Integrated ultrasonic occupancy sensor
• Fixture options: 1 or 2 lamp; 120V or 277V; 2- and 4-foot lamps
• Ballast options: 5, 10, or 33% of full light level
• Meets 1 fc code (local and national)
• Meets new ANSI code (10 fc)
Bi-level Stairwell Fixtures

Key Benefits

• Provides light only when needed
• Stairwells are often unoccupied
  … 11-25% occupancy in 3 CA demos
  … 32% occupancy at UC Berkeley demo
• ~40-60+% energy savings in CA demos
• 2 to 8 year simple payback (new bldgs.)
Bi-level Stairwell Fixtures

*Code Opportunity*

- Require high-low lighting with occupancy sensors in stairwells
“Smart” Bathroom Lighting

Overview

• Integrated LED nightlight
• Integrated vacancy sensor
• Two versions
  …wall switch or full fixture
• Great application in hotels, assisted living, dorms
“Smart” Bathroom Lighting

Overview

• Wall-switch version available from two manufacturers; one since 2002 (~$25-35 ea)

• Full fixture
  … pre-production demos @ $175 ea; production @ ~$135 or less
  … other, lower-cost manufacturers in discussion
“Smart” Bathroom Lighting

Key Features & Benefits

• Integrated 1-Watt LED nightlight doesn’t “walk away”
• Integrated occupancy sensor eases design and installation
• 1-hour off-time ensures satisfied occupants
• Integrated battery backup = improved safety
“Smart” Bathroom Lighting

Key Features & Benefits

• ~50% energy savings
• 1-hour off-time captures most savings & ensures happy occupants
• Integrated design = low-cost installation
• LED night light
  … doesn’t “walk away”
  … improves night lighting compared to operating bathroom light all night
“Smart” Bathroom Lighting

Code Opportunity

• Require occupancy sensors in bathrooms for hotels, dorms, assisted living
• Consider requiring integrated LED nightlights
Hybrid LED Exterior Fixtures

Overview

• 5-Watt LED operates all night
• High light level triggered with occupancy
• Wall-mount for buildings
• Post-mount for walkways
Hybrid LED Exterior Fixtures

Overview

• Wall- & post-mount commercially available
  ... “High-cost” version (~$200) from one supplier now
  ... “Low-cost” version (~$85) from another supplier in early 2006

• Publicly available product specification
Hybrid LED Exterior Fixtures

Overview

• Universal “mounting plate” in development … possible in 2006

• “Security” version in discussion

• Other manufacturers interested too
Hybrid LED Exterior Fixtures

Key Features

• Very low-wattage all night  
  ... beats CFLs

• “Full” lighting when needed  
  ... built-in security indicates occupancy

• LED life ~10-20+ years  
  ... beats CFLs

• Integrated occupancy controls
Hybrid LED Exterior Fixtures

Key Benefits
Higher energy savings than operating CFLs all night

Code Opportunity
Stimulate use of high-low exterior lighting
Summary

• All products commercially available … or will be within 6 months

• Most products have multiple manufacturers or generic, non-proprietary specifications … more manufacturers “coming soon”