



Hotel Bathroom Lighting Control System

“A real win-win with 50% savings, reduced maintenance, fewer customer complaints!”

– Bob Hughes, DoubleTree Hotel Director of Operations

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Energy Savings Opportunity

Many hotel bathroom lights operate during unoccupied times, wasting electricity, and increasing maintenance costs. Research has shown that many guests do not turn off the bathroom lights when they leave their room and more than 40% use the bathroom light as a nightlight.

As Lawrence Berkeley National Laboratory (LBNL) lighting researcher Michael Siminovitch found, “More than 75% of the energy used by these fixtures occurs when bathroom fixtures are left on for more than two hours at a time and most often during the overnight hours.”

The Watt Stopper Inc., LBNL, and the Sacramento Municipal Utility District (SMUD) partnered in research to develop a Bathroom Lighting Control System, the WN-100 Motion Sensor Nightlight, to address the inefficient use of hotel bathroom lighting.

The result is a wall-mounted light switch with a built in occupancy sensor and an LED nightlight. While these technologies are not new, the WN-100 Motion Sensor Nightlight combines them in an innovative system which saves electricity and decreases maintenance costs.

DoubleTree Hotel Test Site

The DoubleTree Hotel in Sacramento, California was chosen as a test site for the new WN-100 Motion Sensor Nightlight technology. Staff electricians replaced 448 standard wall switches with the new sensors. Prior to installation, LBNL researchers measured the light usage in 15 guest bathrooms for two months to establish baseline usage. The researchers then monitored the same bathrooms for two months after installation to quantify energy savings.



WN-100 Motion Sensor Nightlight Highlights

Energy Savings

Minimizes lighting overuse and achieves 50% energy savings!

Operation & Maintenance

Cuts O&M costs by 33% by reducing lighting use, resulting in extended lamp life and fewer burned-out lamp complaints!

Occupant Comfort & Safety

Supports nighttime vision with energy saving, low-level LED illumination.

Manufacturer: The Watt Stopper Inc.

Market: Widespread application in hotel bathrooms, military housing, and healthcare facilities.

Site: DoubleTree Hotel in Sacramento, California

Installation-related Costs

New Construction: The WN-100 Motion Sensor Nightlight requires the same labor to install as any wall mounted switch and costs \$38 per device when purchased in large quantities.

Retrofit: The Watt Stopper Inc. estimates that installation requires about one half hour, costing about \$68 per room using a standard electrician rate of \$60/hr and a cost of \$38 for the device.

Payback

Providing night lighting and occupancy-based lighting control, the WN-100 Motion Sensor Nightlight delivers both energy and non-energy benefits. Using the above costs, the simple payback from energy savings alone was calculated to be 5½ years for retrofits and 2½ years for new construction using 64W bathroom luminaires. At the DoubleTree Hotel, as lamp usage decreased, so did energy use, lamp replacement, and customer complaints. Facility managers estimated that the product reduced operation and maintenance costs by 33%, further shortening the payback by as much as a year.

Study Results

The DoubleTree's pre- and post-installation data shows a 50% reduction in energy use! As expected, most savings occurred from 10:00pm to 3:00am and from 7:00am to 1:00pm supporting previous findings that bathroom lights frequently operate during unoccupied times and are used as nightlights.

The DoubleTree study achieved the following significant cost savings:

- Number of Rooms 448
- Retro-fit cost per Room ~\$45 (including utility incentive)
- Project cost ~\$20,000 (including labor)
- Annual energy savings ~ 66,500 kWh
- Annual cost savings ~ \$8,000
- **Simple payback ~ 2.5 years**

Equally impressive were the non-energy cost savings resulting from decreased lamp replacement and associated O&M maintenance. Lamp replacement costs were reduced from ~\$1500/month to ~\$1000/month, a 33% reduction resulting in an additional \$6000/year savings!

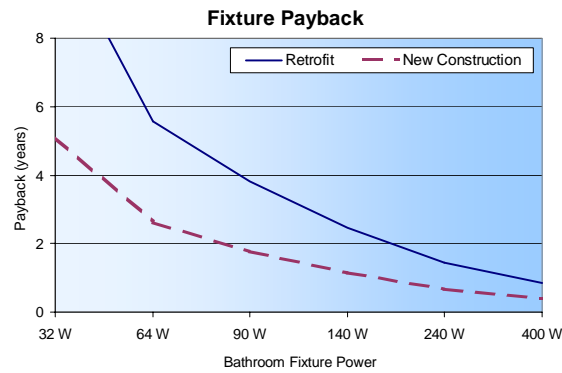


Figure 1-Simple payback in years for new and retrofit applications, assumes \$.14/kWh, not including O&M savings.

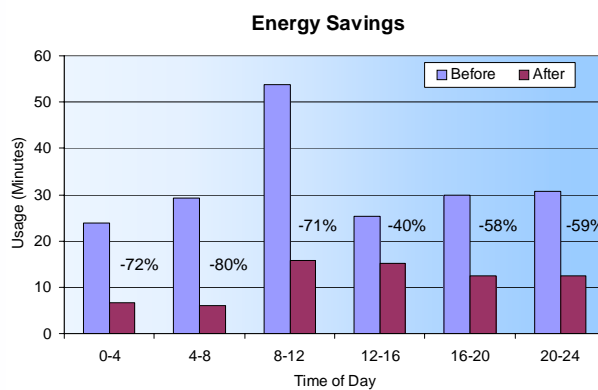


Figure 2- Average energy reduction in a typical room before and after retrofit. The greatest savings are seen between 8 a.m. and 12 p.m. when occupants vacate the room and leave the lights on.

Conclusion

At the Sacramento DoubleTree Hotel, the WN-100 demonstrated significant electricity and O&M cost savings, resulting in a two and a half year payback. The nightlight feature was well received, with no complaints on the customer comfort questionnaires and a number of positive responses specifically mentioning the added comfort provided by the nightlight. By installing the WN-100 Motion Sensor Nightlight, the DoubleTree Hotel reduced bathroom luminaire energy use by 50%, reduced customer complaints, and decreased O&M costs.

Availability

The Motion Sensor Nightlight is currently being offered for sale through The Watt Stopper catalog (www.wattstopper.com). The expected retail cost is \$58 per individual unit or approximately \$38 per unit for large volume purchases. Utility incentives may also be available.

About PIER

This project was conducted by the California Energy Commission's Public Interest Energy Research (PIER) program. PIER supports public-interest energy research and development that helps improve the quality of life in California by bringing environmentally safe, affordable, and reliable energy services and products to the marketplace.

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