

## Project Overview

Pepperdine University  
Malibu, CA

Energy Retrofit



Lutron wireless controls drive a no-cost energy retrofit at Pepperdine University.

### Pepperdine—An Environmental Tradition with an Even Greener Future

On the beautiful Pepperdine University campus, sustainable design is not a new idea. Since 1972, when the school first introduced its water-reclamation program, the university has embraced sustainable practices and environmental stewardship. A testament to the university's commitment, it was recently named *One of The Top Green Colleges in North America*<sup>1</sup> for the second time.

When the opportunity arose to implement a major lighting retrofit on the university's Drescher campus, Les Thomas, Manager of Energy Services, used Lutron wireless controls to maximize energy efficiency while ensuring that Pepperdine remained a comfortable, productive place for faculty, students, and staff.

Working with Southern California Edison's (SCE's) *Private Schools and Colleges Audit and Retrofit Program* and its contractors, Mr. Thomas implemented a wireless control solution in order to reduce labor and installation costs. By complying with program guidelines, the costs were 100% covered by available SCE incentives.

*"The wireless occupancy sensors are doing their job to lower costs and reduce energy waste."*

*Les Thomas, Manager of Energy Services, Pepperdine University*



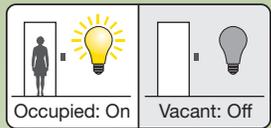
<sup>1</sup> <http://www.princetonreview.com/green-guide.aspx>



Ceiling-mounted, wireless occupancy sensor.

A ceiling-mounted occupancy sensor detects a person's presence as soon as he or she enters the public area.

## Energy-saving strategies



Wireless occupancy sensing

## Challenge

SCE's Private School Program provides private institutions with services to implement cost-effective, energy-efficient measures to permanently reduce their electricity usage. The Program Implementer, FCI Management, Inc., performed preliminary program services to Peppertine as a qualifying customer, including an energy survey and a summary of the identified energy-efficiency measures for the school.

In addition to a fixture retrofit, two control opportunities were identified:

- Install occupancy sensors to turn off lights in unoccupied offices and classrooms
- Reduce HVAC costs in unoccupied classrooms by leveraging the lighting occupancy sensors in a cost-effective way

The original plan anticipated installation of a wired system, but the installation and material costs exceeded budget requirements, and did not ensure satisfactory results.

Mr. Thomas tested samples of Lutron Energi TriPak® wireless sensor solutions against other occupancy sensor options, and determined that the Lutron products were flexible and easy-to-install. He also knew a wireless solution would reduce labor and material costs, and could be implemented within the university's aggressive time frame.



Occupancy sensors in classrooms also turn air conditioning units off when the classroom is empty, reducing HVAC costs by 14%.



Wall-mounted, wireless occupancy sensor.

## Solution

### Wireless control solution meets performance and budget goals

Working with FCI, Mr. Thomas proposed a lighting control solution that included Lutron wireless occupancy sensors, switches and relay modules in each area to ensure lights are turned off when the space is empty. In many rooms, Lutron wireless wall switches provide three-way control with no additional wiring required.

He also recognized the opportunity to reduce energy used by the HVAC system. To capture this opportunity, wireless contact closure modules (CCOs) were installed with the remote VAV boxes which regulate air supply in each classroom. The CCO modules communicate directly with the same wireless occupancy sensors that control lighting.

Now, when the classrooms become unoccupied, lighting and cooling loads turn off automatically. The wireless CCO modules communicate with the wireless occupancy sensors through ceilings and walls, making it possible for the contractor to deliver an integrated solution within budget.

### A successful installation

FCI turned to Positive Energy, an industry expert with 20 years of experience with Lutron products to install the wireless control solutions. Positive Energy was able to install the entire retrofit project, including all the controls, over two weekends – minimizing disruption to campus operations.

“Tasks that add time, like hunting down junction boxes, add cost and eat up budget allocation. They can be job killers, but wireless controls solved that problem,” said Rob Pieroth from Positive Energy.

Positive Energy’s Steven Yamasaki explained that the wireless sensors also provided greater flexibility during the installation, “Depending on how each room was configured we were able to choose between a wall-mount and a ceiling-mount sensor, with the same functionality and setup.”

Lutron Energi TriPak wireless solutions reduce labor and material costs.



The lighting control solution includes:

- wireless relay modules
- wireless occupancy sensors
- wireless switches—Maestro or Pico remote (shown)



The HVAC solution includes Lutron wireless CCO modules that communicate with the wireless occupancy sensors



*Wireless occupancy sensors throughout the retrofit are reducing lighting energy usage by 20-30%, and overall HVAC energy use by an additional 14%.*

### Results

Encouraged by the results, Pepperdine is already working on a proposal for the school's lower campus. Project stakeholders estimate that the occupancy controls throughout the retrofit are reducing lighting energy usage by 20-30%. In addition, by integrating the VAV boxes wirelessly to the occupancy sensors the solution is reducing overall HVAC energy usage in the classrooms by an additional 14%.

"Following established best-practices, SCE computes the cost-effectiveness of all energy-efficiency programs. The results of our cost-benefit analysis confirm that the Pepperdine project is cost-effective," reports Solaris Technical's Fiela Gutierrez.

Mr. Thomas also emphasizes the importance of the energy retrofit, "Pepperdine's centralized building management system allows us to easily evaluate when lights are on and off, and where the HVAC use is affected. The occupancy sensors are doing their job to lower costs and reduce energy waste."

He also knows the systems are maintaining a comfortable work/study environment, "Generally, if I'm not getting any negative feedback, I know everyone is happy. If the lights were turning off when people were in the space, or students were cold in the classrooms, I would definitely know. Any time we can strike the perfect balance, we know we've made the best choice."

*SCE Disclaimer – This case study is presented for informational purposes only. Savings and incentives will vary by project and customer.*

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