

The historic Hills Plaza building in San Francisco's South of Market waterfront district is home to high-profile companies including Google and global architecture and design firm Gensler. When global commercial real estate services company Jones Lang LaSalle (JLL) decided to upgrade the lighting in the parking garage, they wanted a solution that would be as forward-thinking as their tenants.

Hills Plaza is a 3.2 acre multi-use complex with two popular restaurants and 64 luxury condominium suites atop a main commercial office building. The 186,000 square-foot, two-level parking area serves occupants with considerably different needs. The building management team had considered a switch to wireless lighting controls for the garage for several years, but until recently, had not found a solution that could meet all of their goals.

Goals and Implementation

The Hills Plaza team had several criteria for the upgrade. They wanted to mitigate rising energy costs, enhance security throughout the parking area, improve lighting control and light levels, enable Automated Demand Response (ADR), and implement more sustainable operating procedures. In keeping with the building's history of using cutting-edge facility management tools, the team also wanted to use the most advanced lighting control technology available.

Although retrofitting the 175 existing fixtures with a wireless system was a viable option, the Hills Plaza management team decided to upgrade their 22-year-old rusted strip fixtures with new vapor-tight fluorescent fixtures that are factory-installed with wireless light controllers. Fixtures installed in critical areas, such as drive intersections, were equipped with occupancy sensors. Once installed and online, only 45 sensors were needed to wirelessly control all 175 lights; each fixture can be programmed to respond to multiple specific occupancy sensors. The control strategies deployed in this garage were occupancy detection, demand response, and smart scheduling, and all

were accomplished with the use of dimming. In a vacant condition, light fixtures are at a uniformly dimmed state of 20 percent light output. When the area is occupied, the maximum light output is 80 percent.

The system in place at Hills Plaza responds to the real-time use of the garage. When a vehicle drives in or a pedestrian walks off the elevator, sensors respond by not only raising the light level in the occupied area, but ahead of the vehicle and foot traffic as well. This is called predictive lighting. The networked system represents a considerable departure from the conventional method of hardwiring occupancy sensors to specific fixtures, lighting only specific areas. The enhancements to both occupant comfort and safety are made possible by an intelligent system.

The predictive response is enabled by a variety of factors:

- Built-in occupancy sensors are located on fixtures spread throughout the garage.
- Occupancy zones are defined down to the fixture level and aggregated into flexible groupings, responding to real-time movement within the garage.
- Occupancy sensor timeouts are remotely programmable and easily adjustable.

Some features came about after staff worked in the newly-retrofitted garage and asked for changes to be made. For example, building engineers realized the area outside the door to the maintenance offices would be better illuminated if a sensor detected exiting staff before they actually opened the door. An occupancy sensor was installed in the hall to do that.



New lighting technology saves energy and provides

By Philip Lavee

The system enables both manual and automatic load shedding in response to utility requests. While the building engineers have not yet decided to automate their demand response with local electric utility PG&E, the Automated Demand Response (ADR) capability was one of the reasons JLL chose to invest in the system they did; should Hills Plaza decide to participate in the program, activating the system is simple. This would allow building management to take advantage of attractive smart grid incentives, further increasing the total system energy and financial savings.

Smart Scheduling

The top floor of the garage mostly serves the restaurant, bar, and offices and has a considerably different usage profile than the bottom floor, which is primarily used by building staff and condominium tenants. The vacancy light level was set at 20 percent throughout the facility, allowing for the underground structure to be semi-lit at all times. The condominium owners, however, asked that the minimum lighting level in their area be increased slightly. The programming change to raise the standby level of that area to 40 percent was completed in minutes.

After the system had been active for several weeks, the team noted the condominium parking area and spaces immediately outside the engineering offices on the lower level were rarely accessed after normal business hours. A schedule was added to turn off the fixtures near the engineering office from 12:30 a.m. to 5:30 a.m. each day and lower the condo parking area lights as well.

Maintenance is simplified with the retrofit as well. The networked solution streamlines lighting maintenance and reduces security risks by notifying the management team of lamp or ballast failure. The system checks for lamp and ballast failure by tracking real-time energy use at the fixture level and monitoring for any variation from the intended power consumption. When a flood from one of the restaurants leaked through the conduit and disabled one of the garage's new fixtures, the system immediately generated an alert with location-specific details.

The Hills Plaza engineering team makes good use of the system's analysis and reporting tools to review the facility's use patterns in each area of the garage. Because of this, they have been able to adjust control strategies for maximum efficiency and effectiveness. Using this information, they decided to turn off the fixtures in a little-used storage section of the lower level of the garage when vacant, saving 20 percent more energy when the lights are on standby in that area.

Results

The wireless lighting control system in place at Hills Plaza has met and surpassed the goals of the retrofit. The system has saved more than 24,000kWh since being activated in March 2011, representing a total demand savings of 40.5 percent kW over the old system. Ongoing savings are reported in real time on the system dashboard. Current and projected kWh savings and the percentage they represent are summarized below. **P**



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additional benefits for multi-use garage



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