



Brookfield Office Properties



Region Director, Engineering,
Kevin Devine and Brookfield
Office Property Manager
Paula Culp

Office of the Future Lights Way to Savings for Brookfield Office Properties

Controllable Lighting Equipment

Building owner, Brookfield Office Properties, partnered with Southern California Edison (SCE) on the project, conducted as part of the "Office of the Future" initiative to demonstrate the benefits of introducing advanced energy-efficient design and highly controllable lighting equipment into office spaces. The project's renovation included the lighting system and controls in Brookfield's 2,000-square-foot building management office, housed in the Landmark Square 24-story, 443,000-square-foot building that provides office space to 42 tenants.

This suite showcases how offices of the future can use highly efficient lighting systems — with integrated controls — to dramatically lower energy consumption and costs, facilitate Demand Response (DR) curtailment strategies, improve the environment and give employees more flexibility and control over their workspaces.

Upgrades made to the office suite, which includes five private offices, a conference room, kitchen, lobby and corridor, were comprised of:

- Installing T8 fluorescent lamps with electronic dimming and ballast

controls, as well as compact fluorescent and light-emitting diode (LED) fixtures

- Using high-end trim/tuning to program target light levels for each space's lighting needs
- Placing advanced occupancy sensors to dim lights in unoccupied spaces
- Programming light levels to automatically adjust to the amount of daylight available in each office area
- Providing office users with wall-based and handheld remote dimming controls to adjust lighting levels to meet their needs
- Programming after-hours lighting controls to ensure maximum efficiency during office suite cleaning times
- Programming the lighting controls to automatically reduce power consumption during a DR event
- Providing plug load devices, which plug into electrical outlets to reduce the energy consumption of active equipment, switch off inactive equipment or eliminate extraneous equipment

Estimated Savings by Managing Energy

- *Building Name:* Landmark Square "Office of the Future"
- *Ownership:* Brookfield Office Properties
- *Location:* Long Beach, Calif.
- *Industry:* Office Building
- *Description:* Installation of advanced lighting design and integrated controls in a 2,000-square-foot office space at the 24-story Landmark Square office building
- *Project Results:*
 - Nearly 75 percent reduction in energy use for energy-efficient lighting compared to the previous lighting system, with an average lighting power density of 0.26 watts per square foot
 - Easy and effective implementation of curtailment strategies during DR events as a result of fully integrated lighting controls

Energy Management Success Story

Customers utilizing SCE Energy Efficiency (EE) and DR incentives to offset the procurement and installation of the types of technologies installed by Brookfield Office Properties could expect an approximately two- to three-year payback on their investment.

A Nearly 75 Percent Drop in Lighting Energy Use

The Office of the Future program strives for at least a 25 percent energy savings over applicable codes in its projects. The Brookfield Office Properties project at Landmark Square showed extremely impressive results, with a nearly 75 percent reduction in lighting energy use compared to the old lighting system (see table below).

The installed lighting controls responded to DR events by dimming the lighting proportionally to the requested power reduction. This approach produced effective results given the dynamic nature of the lighting systems due to their daylight and occupancy sensor controls.

Brookfield Office Properties' Southern California Region Director, Engineering, Kevin Devine says, "Lighting accounts for 35 to 40 percent of a building's energy use. Here's a showroom to demonstrate how to reduce lighting energy usage. We encourage our tenants to consider the most efficient, sustainable applications in their spaces."

Brookfield Landmark Square Office of the Future Lighting Upgrade Results

	Connected Load	Lighting Power Density		Lighting Energy	
		Calculated	Actual	Calculated	Actual
Old System	1,564 watts (W)	1.00 W/sq. ft.	1.00 W/sq. ft.	1,564 W	1,564 W
New System	2,076 watts (W)	1.33 W/sq. ft.*	0.26 W/sq. ft.	2,076 W	406 W

A Nearly 35 Percent Drop in Lighting Power in a DR Event

In addition to being highly energy-efficient, the new lighting systems installed at the office suite have the capability to respond to DR events. To demonstrate this capability, a series of test events were conducted on different days and at various times of the day.

The DR tests produced different power reductions throughout the day based on the requested power reduction, daylight availability and office occupancy level.

"Even with the output of the Brookfield office lighting system limited to 70 percent of the connected lighting level — and further reductions made with applications like daylight harvesting, occupancy sensors and user controls — the lighting levels are more than adequate," says Brookfield Office Property Manager Paula Culp.

"The system's flexibility offers a huge benefit for the individual with personal control of the workspace and the potential of lowering operating and maintenance costs," she says.

"Lighting accounts for 35 to 40 percent of a building's energy use. Here's a showroom to demonstrate how to reduce lighting energy usage."

Kevin Devine, Southern California Director, Engineering for Brookfield Office Properties

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