



Automated Window Treatment System

Automated window treatments maximize daylight, reduce electric lighting energy usage, and control glare.

Daylight redirecting automated window treatment systems have two parts: automated roller shades for the view portion of the windows, and automated lightshelves above. The functional fabric lightshelf enables the entry of diffused, glare-free daylight while the shade assembly controls solar heat gain and UV light penetration. **Indoor Sky's** Daylitter Shading System functionality includes rotatable lightshelves that dynamically respond to the time of day and time of year.

The roller shades are constructed of lightweight dual-faced woven fabric. The exterior is a lighter grey color to minimize solar heat gain, and the interior is a darker color to reduce glare and improve views. A three percent perforation allows light to come through while allowing for remarkably clear views to the outside while restricting glare and heat. Each shade can be operated independently or programmed to operate in groups powered by a low voltage direct current (DC) motor located inside the extruded aluminum tube of the shading device. The lightshelf motor is geared to operate slowly, at only three rotations per minute.

Lightshelves match the fabric of the roller shades and can be moved automatically or manually to the desired position to block low sun angles. When parallel to the floor, the 12 to 24 inch deep lightshelves redirect the incoming daylight so that it bounces onto the ceiling. This extends the typical 8-10 foot daylight zone to about 20 feet into the space. It also diffuses and flattens the illuminance ratio of the otherwise direct, and sometimes harsh, daylight. The adjustable light shelf also provides easy access for cleaning.

Daylighting with lightshelves provides a comfortable space that promotes worker wellness, creativity, and productivity—the foundation of corporate performance.



Upper blinds or lightshelves are independent of the lower shades and provide daylight that reduces energy use. Automated lower shades can be adjusted through the day, or during a meeting, to respond to occupant needs.

Rollease Acmeda's Illuminate daylighting shades automatically redirect light deeper into the space while separately controlled perforated shades allow views to the outside. Credit: TRC Companies, Inc.

Automated Shading System Features and Benefits

For Occupants. Increased availability of daylight is shown to improve productivity and stimulate biological patterns. The shading system results in a more even distribution of light across the space which helps reduce eye fatigue that can result from direct sun and variable light levels. The lower shade allows connectivity to the outdoors, even when in the closed position, while controlling glare and heat gain.

For Building Managers/Operators. Lightshelves cast daylight deeper into the work area reducing electric lighting up to 40% when combined with LEDs and advanced daylight controls. Radio frequency (wireless) transmission allows for integrated communication between the shade motor and the building's existing operating system using a Wi-Fi hub. A master remote control allows the building manager to adjust automation of the shades outside of a set schedule. Other individual shade adjustments may be handled through a smart phone or tablet application, giving the system full flexibility and personalization of private office space.

For Owners. Upgrades to advanced technologies like automated window treatment systems add value to real estate and provide leading lease conditions for workers. The system can decrease operating costs, save energy, and support public and corporate sustainability metrics. Incentives and tax credits may also support these upgrades.

Benefits of Automated Lighting and Shading Systems

Owners

- Modernized building
- Reduced operating costs
- Higher tenant satisfaction

Occupants

- Personalized control
- Thermal comfort
- Elimination of glare
- Maintained views

Operators

- Centralized data and control
- Reduced maintenance of lamp change outs
- Reduced comfort complaints



Jersey Shore State Bank, Williamsport
Credit: Indoor Sky



The Dayliter interior lightshelf can be lowered for easy cleaning. Nuweld, Williamsport
Credit: Indoor Sky

Costs and Energy Savings

Automated shades are available in any fabric offered in conventional roller shades. A hand-operated, fabric lightshelf made by Indoor Sky adds about \$180 to the cost of an average roller shade while a crank operated model adds about \$280, regardless of size. Motorized lightshelves typically add about \$350 to the cost of an average roller shade.

New Buildings Institute led a study for the California Energy Commission that included lab testing and field demonstrations on a similar product—Illuminate by [Rollease Acmeda](#). Compared to a typical existing office building with T8 lamps, the lab study by Lawrence Berkeley National Lab found that lighting energy savings from shading systems and luminaire-level lighting controls ranged from 62% in winter to 76% in summer in the extended daylight zone. The increased savings during the summer months is a direct result of additional daylight entering the space and offsetting electric lighting consumption. LBNL researchers also found that the HVAC cooling load in the existing building was reduced by 36% in summer, and by 28% in the fall.

In the field demonstration at two Los Angeles area offices the annual lighting savings for the building was 35-42% from the upgrade to LED lights with network lighting controls and the automated shades with upper daylight directing louvers. The field demonstration used a similar shading product and the findings are in case studies by building at the [Leading in LA Project website](#).

Automated shading systems bounce daylight deep into the workspace reducing the use of electric lights contributing to savings up to 76% of lighting energy consumption.

Integrated Technologies are Key to Office Upgrades

The automated shades with daylight redirecting upper portions are a part of an integrated system that includes upgrading lighting to LED lamps and network lighting control (NLC). An ideal type of NLC is luminaire-level lighting controls (LLLC) that provides control at each fixture to optimize energy savings and space control. This integrated system delivers the savings shown in this technology profile. In addition, building owners should layer in retro-commissioning that involves no material costs but professionals adjust the control sequences on the heating, air-conditioning and ventilation (HVAC) and truly tune the system and improve performance and reduce energy use. Today's owners and building operators should look at upgrading with integrated systems to keep their offices as contemporary and comfortable as possible.

New Buildings Institute (NBI) developed this technology profile.

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EPIC invests in scientific and technological research to accelerate the transformation of the electricity sector to meet the state's energy and climate goals.



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Program Information

Southern California Edison's [Energy Express and Customized Solution Programs](#) offers incentives.

Other California utilities also have programs for upgrading to advanced technologies. Check your local utility web site.

NBI Program Information

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Read More: [Leading in LA](#)



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