

Solutions for Today's Facility Maintenance Professional

# BUILDING SERVICES

## MANAGEMENT

[bsmmag.com](http://bsmmag.com)

Vol. 17, Issue 12

December 2017

# 2017

## Top Products & Services

# INSIDE & OUT

## Deicing Products that are Safe

# TEN FACTORS

## for Creating a Legionella Risk Assessment



THE CONCOURSE  
ROCKEFELLER CENTER

# Harvest the Power

## Daylighting to Reduce Energy and Improve Comfort

BY SCOTT TAPIA

**L**ighting represents the largest source of electricity consumption in U.S. commercial buildings — up to a third or more. So, when you want to dramatically reduce energy consumption and costs — and who doesn't — lighting is a great place to start.

Installing high-efficiency LED lighting can help save a lot. But beyond just replacing light bulbs and fixtures, you can harness the power of natural daylight and take energy reduction to the next level. Depending on existing lighting technology, level of integration of lighting controls, and the baseline of the building, you can save upwards of 75 percent of the energy used for electric lighting in a building!

Called daylight harvesting, this concept of using natural light to supplement energy-consuming artificial light has been around for a while. However, while the benefits were clear, in the beginning the cost was high, and only the most hardcore sustainability proponents could afford the investment.

Fast forward a few years and the technology has matured and costs have come down. This, and the fact that energy codes such as Title 24, IECC, and ASHRAE are starting to require it, has helped the practice of daylight harvesting gain momentum.

Simply put, daylight harvesting uses sensors and controls that allow electric lights in a space to automatically dim or turn off when enough natural light enters the space. While most buildings have windows and skylights to provide some natural light, daylight harvesting controls and maximizes that natural light — using it much more effectively.

Since the need for electric lighting changes depending on the time of day, the position of the sun, and the weather, the most efficient daylighting systems are automated and constantly monitor the natural light present at any one time. If it rises above the desired level, the artificial lights dim; if it drops below, they brighten. So, when it is sunny, artificial lights automatically dim and natural light becomes the main source of interior light. When it is

overcast, the interior lights brighten to compensate, and the space remains at a consistent, comfortable light level.

Daylighting systems automate this process, removing the human element of control by using a light sensor that measures light levels and sends them to a controller that is connected to the lighting control system. The light sensors are typically small, and use a light-sensitive photocell, input optics, and an electronic circuit to convert the photocell signal into a control signal. Light sensors may be mounted on walls, ceilings, and even as a part of the light fixtures.

### Advantages of Daylight Harvesting

As a property owner/manager, you have to meet environmental regulations and sustainability standards while keeping operating costs down. Not only is harnessing the power of natural light a great way to reduce energy, natural light has proven psychological benefits as well. Studies show spaces illuminated with natural elements such as daylight and greenery can improve creativity, productivity, learning, and health.

Hard and soft benefits of daylight harvesting include:

- Reduces Energy Use

Reduces electricity used for lighting by 50 to 75 percent depending on the sunlight available and the system.

Reduces waste heat generated by electricity, which reduces building HVAC loads and usage by an additional 10 to 20 percent.

- Decreases Operating Costs

Reduces utility costs through reduced energy use and waste.

Reduces maintenance costs by extending the life of LEDs and drivers.

- Minimizes Environmental Impact

Reduces energy waste and light pollution.

- Meets Building Codes and Standards

Helps satisfy compliance with mandatory requirements set for building construction and renovation — including ASHRAE, Title 24, IECC, and IgCC.

Can contribute to obtaining points in several LEED credit categories.

- Enhances Tenant Satisfaction

Optimal lighting environment improves occupant comfort and health.

### Types of Daylight Harvesting

With the advancement of lighting technology, there are more solutions for daylight harvesting than in the past. This allows you to choose the sensor and control type and method that best fits your space, energy goals, and budget. Types of daylight harvesting include:

**Switched Daylighting:** Natural light thresholds are set that trigger action. Once the daylight entering the space is enough to exceed the minimum required level, the electric lights turn off. They remain off until the point the natural light can no longer sustain the minimum required light level in the space.

**Bi-level Daylighting:** Very similar to switched daylighting, but with the addition of a 50 percent light level. Electric lighting moves from 100 percent to 50 percent to off as daylight becomes more abundant.

As the total light in the space increases, the electric lights dim to 50 percent. They'll turn off once the daylight entering the space is enough to provide the minimum required light level for the space. The bi-level, or 50 percent level, helps avoid the space being over lit before there's enough daylight to provide the minimum required amount of light.

**Continuous Daylighting:** Involves smooth, consistent dimming that maintains the desired light level. It continually and gradually adjusts electric lights based on the amount of daylight that's always in the space, ensuring the minimum light level is achieved without over-lighting the space.

Different sites have very different needs, so it's important to choose the right products and technology for the application. Consider the space, light levels, geographic area, and more. [BSM](#)

**Scott Tapia** is the Southern California Regional sales manager for ABM Industries. For more information, go to <https://www.abm.com/electrical>.