



engineering

Lighting, the way to energy savings: What system is best for your space or your tenants' spaces?

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With all the new technologies proposed to increase energy efficiency in new and renovated buildings, lighting controls is the one that is most visible and accessible to a tenant. While a building might have energy efficient mechanical systems, most tenants have no control over them. They are provided with a pre-determined amount of air and water for their systems. They are given a certain amount of electricity

and need to use it to the maximum potential.

Sustainable designs in a new building come from many of the base building systems, most of which are not, and should not be seen by the tenants or visitors to a building. Lighting is the exception. Take a moment to look up at your office door; chances are you will not see a light switch. The days of the manual toggle switch to control lighting are coming to a close. The days of automatic lighting controls are here, from a simple occupancy sensor, which you most likely have in your office, to an entire floor and even entire building lighting control systems.

The occupancy sensor is the basic and most common form of lighting control. Located by the entry to a

small office or ceiling mounted in larger offices, it activates the lights upon sensing motion, or infrared

time clock system, with override switches, to a fully digital lighting control system that controls lighting

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light and keeps the lights on as long as one is present. Once an occupant leaves, the lights are automatically turned off after a pre-determined time.

Depending upon occupancy, lighting control systems can vary in their complexity. From a simple

based upon a predetermined zoning plan or exposure.

A sample floor zoning plan would use occupancy sensors to control private offices and restrooms. Typically, conference rooms would have standalone dimming systems. It is in open office space and corridors

where the lighting control systems have improved and expanded to become more cost effective. Instead of being controlled by a simple time clock which merely turns the lamps on or off, these systems now dim the lighting automatically based upon outside lighting exposure. This very efficient control strategy is known as Daylight Harvesting.

Daylight Harvesting can be a major cost savings item for a client. Daylight harvesting by itself has an estimated 40% savings in energy usage, as a standalone system. When daylight harvesting is combined with other lighting control systems, the savings can reach as much as 65%, which just represents the immediate energy savings. The client will also benefit from savings on the cost of lamp replacements because the lamp life is greater at lower lighting levels.

The Daylight Harvesting System is composed of a photo sensor, which measures the incoming exterior light level at the work surface, usually a desktop. The sensor then automatically adjusts the level of light from the overhead lighting to reduce or increase the light level to achieve the required lighting levels at the work surface. The recommended lighting level in an office environment is 50 foot candles. The photo sensor communicates the incoming light from the exterior to the lighting control panel. The lighting control panel will then adjust the lighting level output accordingly at the fixture, via dimming ballasts.

When designing the layout of the photo sensors, an engineer usually locates the sensors within 5-8 feet of an exterior window. The overhead lighting within that zone is provided with dimming ballasts that are controlled and adjusted by the lighting control system. Thus, the system adjusts the output of the lamps based upon the readings of that photo sensor.

Whether it's just installing local occupancy sensors in offices, a time clock system, or a sophisticated lighting control system, a properly designed and installed lighting system has several benefits to tenants. Lighting control systems reduce the overall electrical consumption; reduce maintenance on lighting fixtures and extends the life of the lamps, thus, creating a "greener building." These control systems also contribute to the LEED certification process, which is an additional benefit to the sustainably minded tenant.

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