Improve Your Vision

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How energy-efficient lighting adjustments can add up to quick savings

Harmonic filtering and canceling devices can be installed at a lighting panel to reduce harmonic distortion. Photo courtesy of Energy Automation Systems, Inc.

One of the major opportunities for fast-payback electrical savings in industrial facilities is lighting. Lighting can account for up to 30 percent of a facility's electric bill. The obvious first step is to replace incandescent with fluorescent lighting, and many plants have already taken this step– but that's just the first. The next step includes replacing high-intensity discharge (HID) lights with fluorescents, treating fluorescents to reduce harmonics and regulate voltage, and adding lighting controls to reduce or eliminate light in areas with adequate ambient light or no occupants.

HID lighting is commonly found in plant areas with high ceilings, such as production, assembly, loading, staging or warehousing. While fluorescents historically could not match their output and thus were a poor substitute for HIDs, lighting advances have led to the development of high-intensity fluorescents (HIFs) which are now superior in most respects to their HID counterparts. HIFs can have many advantages over HIDs: lower energy consumption, less loss of light output over product life ("lumen depreciation"), better dimming abilities, faster start-up and restart times, better color rendition, more light output in the spectrum visible to humans ("pupil lumens"), and reduced glare. Thus, in most applications, fluorescents are both more cost-effective than HIDs and able to provide light of better quality.

Fluorescent Treatment

In facilities that have already replaced incandescents and HIDs with fluorescents, further savings can be achieved by fine-tuning the fluorescents in one of several ways. One way to treat fluorescents is by correcting harmonic distortion, a kind of electrical “feedback” or white noise which increases heat in the light fixture and reduces its electrical efficiency. Harmonic distortion arises in electrical systems with many “non-linear” loads– those drawing current that does not travel in a sine wave.

Fluorescent lights are a predominant non-linear load in most plants, but other examples of this kind of load are computers, monitors, printers and photocopiers. Harmonics can be corrected by the use of harmonic filters or cancellers placed either at a lighting fixture or at the lighting panel to reduce harmonics in the lighting system and increase its efficiency. Reducing or eliminating harmonics in a facility’s electrical system will cause all non-linear loads in the system – not just lighting – to consume less electricity and operate more efficiently.

Be A Regulator

Another way to reduce fluorescents’ electrical consumption is by means of a voltage regulator. A voltage regulator can reduce current to a light fixture by 15 to 30 percent, with a corresponding drop in electrical consumption. The voltage regulator causes a small, often undetectable, drop in light levels.

Automated lighting controls can also help reduce a light’s electrical consumption. The three main types of lighting controls turn lights on or off depending on ambient light, time of day, or area occupancy.

What can these efficiency measures achieve in financial and ecological benefits? By correcting motor and lighting inefficiencies using the fast-payback methods described above, an industrial facility can lower its electric consumption by 10 percent or more. At a plant with monthly electric consumption of 500,000 kilowatt hours, a 10 percent reduction would lower annual electric bills by $60,000 or more and annual carbon emissions by 500,000 pounds.

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