

Title 24 and the LED Light -- More than Energy Efficient

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We've been experiencing California's recurring Title 24 regulatory tightening and its broad objective to foundationally change our built environment. As part of the new standard to reduce usage and deploy higher efficacy lighting, LED bulbs are becoming superstars. And, by combining connectable LED technology with software, tenants and owners can create dramatic changes to their built environment. More than simply an innovation, these advancements have the potential to completely disrupt our thinking about buildings as cost centers. When every light fixture, connected device and climate controlling equipment is managed from a single source, buildings as strategic assets becomes a more tangible and exciting reality.



A typical building saves from 50% to 80% of current energy by just controlling the lighting.

Doug Avery, Lighting Controls Specialist

Rapid Cost Decreases

An LED light bulb is a dramatic departure from the bulbs we have long known. It is actually a semiconductor light source put into a casing that replicates the shape of the incandescent bulb. While LEDs are expected to reduce by half the amount of electricity we use for lighting once in widespread use, behind the cool science is the best part of the story -- the potential and role of the LED light in the wider story of Internet of Things (IoT).

At the onset, LED technology was costly. In 2010, the 60-watt-equivalent LED bulb that used 12 watts cost \$39.97; in 2011, a similar bulb cost \$24.97; and had been reduced to \$22.97 in 2012. By 2013, the bulb used only 11 watts to achieve

the same output of light and was priced at \$19.99. The latest generation of lights is now at \$8. The estimate is that LEDs are improving by 15% annually in terms of light output while decreasing about 10% annually in cost.

Beyond Superior Illumination

The predictable lament from tenants and building owners is that installing energy saving devices such as LEDs have high upfront costs and long leads to recover the investment via lowered energy bills. Paradoxically this view neglects to take into account the secondary benefits of the LED light.

A group of professors (Michigan Ross, Yale and USC, February 2014) studied the installation of LED lights in 25 garment factories and uncovered some astounding upsides to LED lights -- the lights lowered factory floor temperatures that in turn increased employee comfort for higher productivity and profits. By emitting less heat than traditional lights, they were shown to eliminate 75% of the negative impact of temperature on employee efficiency. The increased productivity helped the LEDs pay for themselves in five months versus the expected two year timeframe when considering only the energy savings. The reality is that the productivity gains actually dwarf the energy savings - they estimate that the productivity returns from LED lights were more than four times larger than the energy savings. In this case, the LEDs cost roughly \$6,300 to install and provided direct energy savings of \$3,000 annually while producing measurable productivity increases of \$13,000 per factory per year.

No less impactful are the farming and horticultural applications where LED lighting provided the means for an urban lettuce farm to produce 10,000 heads a day. In other studies the LED light was shown to ramp up tomato production and was used successfully as the only source of light to grow bedding plants indoors.

The growing understanding of the outcomes achievable with LED technology means that LED luminaires and the controls that work alongside them have the capability to be

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Let this custom presentation help you make sense of the changes.

more about possibility and less about cost burdens and constraint.

LED Drives Up Office Productivity

A by-product of improving energy efficient lighting is the quality of light and the ability of LED lighting to give a sense of brighter light. Cornell University researchers found 24% of office workers claimed poor lighting as a factoring cause for loss of work from eyestrain and discomfort. Lighting company Philips has done research showing that simply raising light levels in an office increased productivity 8% and decreased accidents by 52%. Title 24's emphasis on daylighting is supported by data that shows exposure to daylight vs. artificial light enhances alertness and cognitive functioning.

In one of the most significant studies done to date, fixtures were swapped out at the Reno Post Office. Within one year of the installation there was a 6% increase in worker productivity --- an up-tick that paid for the new lights in just 12 months.

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