

# The EAct Tax Aspects of Building Control Systems

*By Charles R. Goulding, Spencer Marr and Charles G. Goulding*

Charles R. Goulding, Spencer Marr and Charles G. Goulding discuss how building management systems offer building owners the opportunity to fundamentally improve their economic bottom line by controlling energy usage with a degree of precision that was previously unachievable.

As more and more building owners put in very energy-efficient building equipment, particularly lighting and HVAC, the next step towards achieving further energy savings is to install building management systems (BMS). These systems allow building owners and managers to optimize their energy consumption by adjusting to variables such as time of day, peak demand, temperature, internal energy use patterns and building security. The data obtained by building management and control systems can be used to perform self-diagnostic and occupancy optimization routines on a frequent basis and to produce trend analysis and annual consumption forecasts.

Building management systems are eligible for favorable EAct “free riding” tax benefits whereby the BMS benefits from prior energy reductions. This means that if a previous qualifying project—on which the building owner did not take his EAct tax benefit—met the required energy-efficiency targets, installing the BMS may well result in new investment EAct tax deductions.

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## EAct Tax Opportunity

The Energy Policy Act of 2005 (EAct)<sup>1</sup> provides an immediate tax deduction of up to \$1.80 per square foot for building investments that achieve specified energy-cost reductions beyond the American Society of Heating and Air-conditioning Engineers (ASHRAE) 90.1-2001 building energy code standards. A one-time \$1.80-per-square-foot deduction is the maximum tax deduction available, but deductions of up to 60 cents per square foot are also available for each of the three types of building systems: lighting, including lighting controls; heating, ventilation, air condition (HVAC), including HVAC controls; and the building envelope, which includes the roof, walls, windows, doors and the floor/foundation (everything on the perimeter of a building that “touches” the outside world). To obtain a tax deduction of 30 cents per square foot for lighting, the wattage must be reduced by 25 percent from ASHRAE 90.1-2001 levels. The maximum allowable tax deduction of 60 cents per square foot requires a 40-percent reduction in wattage for lighting.

## Building Management Technology

Current technologies in BMS mesh software controls with demand management programs. A BMS may be

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designed for a single building or a group of buildings such as university campuses, office buildings, retail store networks or factories. The term “building management system” captures the idea of total building-wide management, but there are two subsets of this larger group: lighting and HVAC. In the HVAC context BMS can be used with technologies such as roof-top and air handler units, variable air volume boxes, chillers, boilers and pumps. When it comes to lighting, which consumes close to 35 percent of the electricity used in commercial buildings, reducing the connected load of the lighting system is only a portion of the potential for maximizing energy savings. The other major portion can be achieved *via* BMS through automatic controls such as occupancy sensing, scheduling, tuning, demand response, adaptive compensation and daylight harvesting.

### **Lighting Controls**

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The key to realizing major tax incentives upon installing a lighting control system is to first make sure that the building’s underlying lighting technology is energy efficient and meets the EAct watts-per-square-foot target.

### **Building Window Daylighting Systems**

Building window daylighting systems coupled with heat-reducing solar shades or window films results in meaningful lighting and HVAC cost-reduction opportunities. Add to that a modern, wireless BMS, and the cost reductions are further accelerated.

For human-occupied buildings like office spaces, the combination of energy-efficient lighting fixtures and daylight harvesting systems are one of the optimal ways to achieve a 60-cent-per-square-foot EAct tax deduction.

### **LEDs**

LEDs are mainstreaming and impacting the lighting industry in a noteworthy, positive way. Despite the fact that when LEDs first entered the marketplace, most analysts and industry experts thought the technology couldn’t be dimmed, companies like Cirrus Logic are now creating the chips necessary to let dimmer switches work with the LED bulbs. This changes the LED landscape in a major way since up until now dimmer incompatibility problems have been a leading cause of product returns because they can cause flickering or flashing light or the inability to turn on or off the light.<sup>2</sup>

### **What Exactly Is Daylight Harvesting?**

In order to have the full energy savings potential of daylight realized, it must be incorporated correctly into a building’s electrical lighting system. The proper way to incorporate daylight harvesting uses controls that work to adjust internal lighting levels relative to the amount of sunlight available. These controls can operate either manually or automatically and can work so that they either dim the light source continuously over the course of the day or switch the source to preset light levels.<sup>3</sup>

### **Retail and Industrial Skylight Installations**

Today’s technology saves especially large amounts of energy with rooftop skylight applications. These skylights can enable retailers and industrial facilities to shut off building lighting for nine to 10 hours a day. Previous generations of rooftop skylights didn’t save anywhere near the amount of today’s energy savings because the light coming through the skylights was very heat intensive. The extra heat increased air conditioning electric costs, which offset the lighting electrical cost. Now, new skylights are non-heat bearing so that the lighting heat reduction actually reduces air-conditioning costs. In addition, many leading lighting control manufacturers have developed state-of-the-art solar shades that can reduce heat accretion as well as damaging UV rays. These shades are powered by an electrical motor and can be operated by the press of a single button.

### **HVAC Controls**

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As with lighting control systems, the key to realizing major tax incentives upon installing an HVAC control system is to first make sure that the building’s underlying HVAC technology is energy efficient.

### **Qualifying HVAC Equipment**

To qualify for an EAct tax deduction, an HVAC project must reduce energy costs at least 15 percent below the costs for a building designed to meet ASHRAE 90.1-2001. The project must use IRS-approved energy modeling software to show the energy-cost savings.

Enough HVAC projects have qualified for EAct tax deductions that it is possible to identify types of projects that most often achieve deductions. Other HVAC projects may also qualify for deductions, but most, so far, fall into one of three categories.<sup>4</sup>

The first category is installation of one or more of 12 categories of HVAC equipment. Although Code Sec. 179D deductions are not limited to specific types of HVAC equipment, and any HVAC project that meets the criteria spelled out in Code Sec. 179D would qualify for a deduction, most deductions to date have been for the following types of projects:

1. geothermal (ground source heat pumps)
2. thermal storage
3. high-efficiency package terminal air conditioning (PTAC) units in apartments and hotels
4. centralized HVAC in apartments and hotels
5. energy recovery ventilation
6. demand control ventilation
7. chillers in buildings of less than 150,000 square feet
8. very efficient heaters in warehouse, industrial and other spaces with no air conditioning
9. VAV devices in buildings of less than 75,000 square feet
10. chilled beam
11. magnetic bearing chillers
12. hybrid gas/electric chillers

The second category is installation of any further energy-reducing HVAC equipment in a building that already meets Code Sec. 179D criteria of energy costs that are at least 15 percent lower than a building designed to meet ASHRAE 90.1-2001. Buildings that already use one of the 12 HVAC equipment categories generally meet that criterion.

The third and final category is combining energy-efficient lighting with energy-efficient heaters in nonconditioned spaces and combining LED lighting with one of the 12 HVAC technologies will often result in \$1.80-per-square-foot EAct tax deductions in conditioned spaces.

## The Importance of Going Wireless

Innovations in wireless control systems have enabled building owners to avoid capital intensive projects required to rewire lighting and HVAC equipment to feed information into the building's central data processing unit. What

this means is that each component of an energy system is able to communicate to the BMS without the burden of having to penetrate walls in the process of adding wires to connect each component. Further, in buildings where there are multiple tenants, wireless control systems enable the building owner and landlord to track, invoice and service tenants' energy usage automatically. Because the wireless devices also have the capability to feed information directly to the utilities, building owners will be able to track and assess energy and water consumption within individual buildings.

This process of utility metering, which can be used for building owners' entire building portfolio, generates energy consumption and cost data that can in turn be entered into benchmark building energy performance software. This provides building owners the data they need to meet their energy goals and identify strategic opportunities for saving energy.

Along with the advances in wireless control systems, today's BMS offer several other advantages over control systems of years past. For instance, older BMS were typically deployed with proprietary protocols and

typically controlled the bare minimum of systems and services. This made them hard to integrate and communicate with other manufacturers' devices, less powerful and locked out ownership from the freedom to totally integrate an "intelligent" building concept. In contrast, modern BMS use open nonproprietary protocol, are easy to interface to manufacturers' equipment, have fast Ethernet and Web-enabled devices and are much more user friendly to enable owner customization.

**In many large jurisdictions, utilities have developed Demand Response programs whereby building owners can receive a payment when they power down their building at peak demand hours.**

## Understanding Demand Response Programs

Perhaps most unique among the investment opportunities related to BMS is the chance to earn revenue by powering down. In many large jurisdictions, utilities have developed Demand Response programs whereby building owners can receive a payment when they power

down their building at peak demand hours. For example, two major companies involved in this initiative are CPower and EnerNOC. CPower's website describes the program as follows: "By enrolling in these programs, participants agree to reduce their electricity consumption in response to peak system demand, grid emergencies or peak wholesale prices, thereby contributing to grid stability and lower market prices. Demand response can be a powerful tool in a company's overall energy management strategy. By participating in demand response programs, companies can earn significant revenue while simultaneously reducing energy expenses through lower consumption. These strategies can help offset the rising costs of energy and improve a company's bottom line."<sup>5</sup>

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## Conclusion

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Building management systems offer building owners the opportunity to fundamentally improve their economic bottom line by controlling their energy usage with a degree of precision heretofore unachievable. The combination of "free riding" EPart tax benefits with demand response revenue means that the investment in a BMS will realize an enhanced economic payback.

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### ENDNOTES

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- <sup>1</sup> Energy Policy Act of 2005 (P.L. 109-58) ("EPart").
- <sup>2</sup> Patrick Seitz, *Cirrus Hopes LED "Dimmer Chips" Shine*, INVESTOR'S BUS. DAILY, Mar. 29, 2012.
- <sup>3</sup> Charles Goulding, Jacob Goldman and Taylor Goulding, *The Tax Aspects of "Daylight Harvesting"*, CORP. BUS. TAX'N MONTHLY, Aug. 2008, at 36.
- <sup>4</sup> Charles Goulding, Jacob Goldman and Kenneth Wood, *Tax Deductions for HVAC Efficiency*, BUILDING OPERATING MGMT., Apr. 2010.
- <sup>5</sup> See [www.cpower.com/](http://www.cpower.com/).

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