SHOWCASE LIGHTING

Tax Deductions Brighten Return on Lighting Upgrades

BY CHARLES GOULDING, JACOB GOLDMAN AND SIDDHARTH SHETH

By all accounts, the Energy Policy Act of 2005 (EPAct) got off to a slow start. Along with many other provisions, the much-hyped law provides tax incentives to encourage more energy-efficient buildings. But there were delays in promulgating the Internal Revenue Service regulations to implement the law. And it's taken a while for facility executives to understand the complex legislation.

Today, however, a growing number of facility executives are coming to see how EPAct may offer significant financial benefits, especially for lighting systems.

Effective Jan. 1, 2006, EPAct provided new tax deductions for specific investments that improve the energy efficiency of either the entire building or one of three building systems: lighting, HVAC or the building envelope. To qualify for those deductions, a project — whether an entire building or one of the three subsystems — must cut energy use compared to the limits specified in ASHRAE 90.1-2001.

The amount of the deduction depends on how efficient the system is. The deductions are available for both new construction and improvements to existing buildings. The project must be placed in service between Jan. 1, 2006 and Dec. 31, 2008. Congress is currently weighing a measure to expand the tax deduction amounts and extend EPAct through the 2012 tax year and through 2014 for projects certified as of 2012.

To date, lighting systems have been by far the biggest beneficiaries of EPAct deductions. One important factor has been tremendous improvements in lighting product efficiency — many of today's lighting products meet the EPAct energy target. Combine those factors with the substantial economic benefits provided by EPAct, and there may well be a solid economic case for installation of high efficiency lighting.

What's more, the process of qualifying for lighting deductions is easier than for HVAC or the building envelope. For those two areas, energy modeling is required. For lighting, two methods are available for obtaining tax deductions. The simpler of the two is the prescriptive method, which is based on watts per square foot and does not require modeling. The second method is modeling to show a 16.67 per cent energy cost reduction compared to ASHRAE 90.1-2001. Modeling is the only way to obtain the benefits of watt per square foot power allowance adjustments for lighting controls.

For links to supplier Web sites go to **WWW.FACILITIESNET.COM/BOM**

The Opportunity

EPAct tax deductions for lighting start at 30 cents per square foot for a 25 percent reduction in light power density compared to ASHRAE 90.1-2001 requirements. The deduction can be as great as 60 cents per square foot for a 40

VENTURE LIGHTING INTERNATIONAL

Uni-Form MP 575 pulse-start metal halide lamp and ballast system replaces 1,000-watt MH lamps. Product produces 60,000 initial lumens and twice the mean lumens of a standard 400-watt metal halide lamp. Arc tube shape improves thermal characteristics and light output. Tipless design eliminates cold spots for more uniform light output and longer lamp life. **CIRCLE #250**

ADVANCE TRANSFORMER

Mark 10 Powerline electronic dimming ballast for use with 24-watt T5 high output and 24-watt long twin tube fluorescent lamps has low-profile design. Ballast requires no additional control wiring and is compatible with controls from many manufacturers. **CIRCLE #260**

UNIVERSAL LIGHTING TECHNOLOGIES

Ballastar light-level switching ballast for T8 lamps provides light level control by switching from full light to 50 percent power using standard wall switches or relays. Ballast is designed to operate either one or two F32T8, F25T8, or F17T8 lamps. Product can be connected to any voltage from 120 to 277 volts.

CIRCLE #262

COOPER LIGHTING

The Fail-Safe LED series of architectural vandal-resistant luminaires features seven face plate choices in six base colors plus custom capabilities for signage and wayfinding. LED modules use 11 Lumileds 3W white LEDs offering 50,000 standard life hours at 70 percent lumen maintenance. The one-piece injection molded lens is designed to obscure lamp image while maintaining efficiency. UL 1598 listed for wet locations. **CIRCLE #253**

ORION ENERGY

The Compact Modular T8 Series high-bay lighting fixtures are available in 2-, 4-, 6-, and 8-lamp configurations. Quick-change ballast pack and modular design enable upgrades or advanced controls to be added. Aluminum "I" frame dissipates heat more quickly than steel, lowering temperature surrounding the ballast. **CIRCLE #273**

percent reduction.

To illustrate the economic benefit, a 100,000-square-foot building that qualifies for the maximum incentive will generate a $60,000 Federal income tax deduction and, in most states, a corresponding $60,000 state income tax deduction.

To qualify for these deductions, a facility has to meet not only the specified EPAct light power density requirements for that type of space, but also comply with some additional mandates. Under the current legislation, in effect until 2008, these additional requirements include bi-level switching and minimum IESNA light levels. Bi-level switching means having at least two levels of light other than off in all spaces. A space is defined as an area surrounded by floor-to-ceiling walls. A dimmer, for example, meets the requirements because it provides multiple levels of light. Two or more switches controlling different fixtures in a space would also meet this bi-level requirement. Occupancy sensors do not, on their own, meet this bi-level requirement because they do not provide two levels of light.

To get a deduction for a lighting EPAct project, facility executives need to know the square footage of the spaces subject to the project, the watts per square foot for all rooms — including new and retained wired lighting — and how the bi-level switching requirement has been met. Documentation for the lighting tax deduction includes a watts-per-square-foot spreadsheet for all wired lighting, a written energy plan, a certification and an inspection document.

Maximizing Benefits

Many lighting projects just miss qualifying for EPAct tax incentives because the lighting systems designer wasn't aware how close the design was to meeting EPAct requirements. There are cases where design needs will trump EPAct qualification but those occasions should represent conscious decisions. In many situations, merely changing one item in

Justifying Energy Projects

EFFICIENCY

Facility executives have a range of economic drivers for lighting projects. Five economic areas can be explored to increase the percentage of lighting and other energy efficiency projects that are approved.

- **ENERGY SAVINGS.** Many of today's lighting and HVAC products can reduce current energy consumption in the range of 25 to 50 percent compared to older products, in some cases products installed as little as five years ago.
- **REBATES.** Many states and local jurisdictions offer substantial rebates for energy improvements. Rebates are particularly lucrative in certain states in the Northeast and in California, where energy supply is limited and costs are high. Some rebates are called prescriptive, meaning that a particular product category gets a prescribed rebate, such as $80 per lighting fixture or $1,000 per air conditioning unit. Some rebates are kilowatt based, meaning that the more a project reduces electricity use, the greater the rebate. Facility executives can now access national electronic rebate databases and, for a fee, have all of the rebate paperwork completed in virtually every jurisdiction where a company has facilities.
- **EPACT DEDUCTIONS.** For projects that meet EPAct requirements, significant tax deductions are available.
- **DEMAND-RESPONSE PROGRAMS.** Many states offer demand-response and demand-management programs where companies can get substantial economic payments for using lighting controls and HVAC controls to reduce electricity use when called upon during demand events or to earn additional revenues for making lighting and HVAC investments that permanently reduce electrical demand.
- **MAINTENANCE COST REDUCTION.** Building maintenance is a high-cost, labor-intensive process, particularly if there are a lot of products with short lives that require regular replacement. Some new energy-efficient products have longer lives, which reduces replacement costs.

— Goulding, Goldman, Sheth

ALANOD ALUMINUM

Miro-Micro Matt for fluorescent high-bay applications has 93 percent total reflectivity and produces up to 20 percent more light than the same luminaire with a white painted reflector. Product is abrasion-resistant, inorganic to avoid yellowing or darkening, anti-static and dust resistant. **CIRCLE #254**

LEVITON

Z-MAX lighting-control relay systems include stand-alone and network-ready models. Service life is 10,000,000 switching cycles. Astronomical clock allows system's location to be programmed to time-of-day settings or a time offset from sunrise or sunset. Relays offer keypad programming with bright LCD panels and on-screen instructions. **CIRCLE #255**

LUMISYS

Maxiom Series controls high voltage lighting circuits via a two-wire RS-485 network, occupancy sensors, light level sensors, momentary override switches, and other input devices. LX5 technology features native BACnet and a range of other protocols. Panels have on-board DDN (Digital Device Network) communication to Digi-Touch addressable switches. UL listed. **CIRCLE #256**

FULL SPECTRUM SOLUTIONS

The EverLast line of fixtures features electrodeless fluorescent technology that has a rated life of up to 100,000 hours and is resistant to EMC interference. The company has seventeen different combinations of lamp wattages in three different styles and offers dimmable options on many models. **CIRCLE #257**

HOLOPHANE

ROAM photocontrols communicate via a wireless transceiver, creating a self-configuring, self-healing wireless network that exchanges data between photocontrols on an event-driven basis. The system monitors itself, reporting outages as they occur. Photocontrol is backward-compatible with light fixtures that have a locking-type receptacle. **CIRCLE #258**

LAMINA

The SoL MR16 LED is designed as a direct, ready-to-plug-in retrofit for 20-watt MR-16 halogen and comparable CFL lamps. This design produces as much light as the 20-watt halogen bulb, but consumes less than 8 watts. Color temperatures of 3,050 K and 4,700 K. **CIRCLE #267**

INTERNATIONAL ENGINEERING PRODUCTS AND CONSULTING CORP.

Lighting control uses solid state electronics with on-site, remote and aggregate Web-based controls for HID lighting. The VB400 contains an electronic ballast and features microprocessors to regulate current flow for metal halide, high-pressure sodium and pulse start lamps. **CIRCLE #259**

FOSTER TRANSFORMERS

LED power supply features short circuit and overload protection and can be

dimmed with a standard dimmer. The power supply is encapsulated in epoxy and housed in a 304 stainless steel enclosure. Power supply can withstand a direct short in excess of 15 days, with no external fusing required. Product accepts multiple input voltages with output configurable for 12 VDC or 24 VDC up to 60 W. **CIRCLE #251**

JUNO LIGHTING GROUP

Elate specification-grade luminaires offer open and lensed downlights, wall wash and adjustables with CFL, induction, HID, incandescent and low-voltage sources. The line also features pull-down and multiple lamp-aiming adjustables for display lighting. **CIRCLE #268**

LITHONIA

The I-BEAM fluorescent high bay lighting system features T5HO cool running technology that is UL/C-UL listed to operate in environments up to 65 degrees C. I-BEAM delivers up to 50 percent in energy savings over 400 watt metal halide lamps, according to the company, and maintains designed light levels over the life of the system. **CIRCLE #269**

OSRAM SYLVANIA

The DURA-One A19 electrodeless compact fluorescent lamp features a rated life of up to 15,000 hours. Offers instant brightness, a starting temperature of –20 degrees

F and unlimited switching cycles. Compared to a 75-watt incandescent A19, the product provides energy cost savings of up to $82 over the life of the lamp, according to the company. **CIRCLE #274**

NEXLIGHT

The WRT4244 dimmer controls fluorescent ballasts that accept a 0-10 volt DC control voltage. The unit is used in conjunction with the WR6161-84 20 amp relay to provide on/off control. Dimmer controls up to 50 ballasts. Dimming groups can be made that contain up to 60 dimmers. **CIRCLE #271**

SQUARE D

Occupancy sensors employing passive infrared (PIR) and ultrasonic technologies are available for wall switches and ceiling-mount applications. PIR wall switch replacement sensors are both 120/277 VAC and cover a 180-degree area with a 300-square foot range. Ceiling sensors offer 360-degree coverage and have a coverage area of up to 2,000 square feet. **CIRCLE #261**

GE

VIO white LED converts violet wavelength to white light, producing less than a 100 degree Kelvin color shift over a 50,000-hour rated life. Product is offered in 3,500K and 4,100K color temperatures. High-power, 4-watt LEDs feature 70-percent lumen maintenance and chip-on-board package that improves thermal management. RoHS compliant. **CIRCLE #252**

ROBERTSON WORLDWIDE

Electra series high temperature ballasts meet ENERGY STAR 4.0 requirements

and have a 90 degree C maximum case temperature. Ballasts available with side leads, bottom leads or bottom leads with studs for one 7- through 42-watt and two 13- through 26-watt CFLs. **CIRCLE #275**

SENSOR SWITCH

nLight lighting offers system-level-control while enabling zones of nLight devices to self-commission and function independently. System provides local control via LCD Gateways, as well as remote, global control through SensorView Web-based software. **CIRCLE #276**

LUTRON

EcoSystem allows workers to control one or more fixtures from their desks using a personal computer. Quantum software control package monitors individual lighting fixtures and power usage, operating hours, monitor lamp and ballast performance. The system allows users to make changes to as many as 100 EcoSystem networks at the same time. **CIRCLE #270**

a design — such as high wattage display cases — or changing out a few more fixtures than originally anticipated makes the difference between no tax deduction and a large tax deduction.

On a national facility project for a large retirement organization, for example, a slight design change increased the EPAct tax deductions from $2,000 per facility to $40,000 per facility.

The first step to obtaining EPAct deductions is hiring a lighting designer who is familiar with EPAct requirements or is willing to learn them. If a facility executive hires an architect or lighting designer who has no familiarity with EPAct, it may well be worth allowing some additional time to learn the standards. It would also be important to ask the designer to explain the rationale for designs involving large building spaces that don't qualify for EPAct tax deductions.

Good design incorporates many different — and sometimes conflicting — considerations. However, it's clear that energy-efficient design is now being given more weight than in the past. There has also been a quantum leap in the energy efficiency of lighting products, which makes it possible to achieve both good lighting quality and energy efficiency. Facility executives should look for a designer who is familiar with today's products and is not merely recycling outdated, inefficient design solutions.

It is also important to keep accurate records of which properties have qualified for EPAct tax deductions and for how much per square foot. For example, a building that in 2007 qualifies for deduction of 37 cents per square foot will have the opportunity to achieve a second deduction of 38 cents per square foot if a proposal to increase the deduction from the current 60 cents to 75 cents becomes law.

Getting a "Free Ride"

Organizations that installed energy-efficient lighting before Jan. 1, 2006 — that is, before the beginning of the EPAct qualifying period — have the potential to get what is known as a "free ride" under the law. That's true if the organization has already achieved the EPAct light power density targets. The reason: Lighting projects undertaken after Jan.

1, 2006, for buildings that have already hit the light power density targets are automatically entitled to a tax deduction. Essentially this means that if a facility already meets the EPAct watts-per-square-foot target, virtually all lighting upgrades will qualify for tax deduction.

Free riding is typically used to obtain automatic tax deductions for lighting controls projects, including occupancy controls, dimming and daylighting systems as well as the lighting portion of building management systems.

More and more facility executives are beginning to understand free riding. At one department store chain, a lighting controls project involving 20 facilities qualified for a "free ride" tax deduction. The chain had invested in energy efficient lighting before EPAct was passed and already met the EPAct watts-per-square-foot requirement before the lighting controls were installed. Most of the projects involved automatic shutoff systems — time clocks or occupancy sensors. Ten stores qualified for the full 60 cents per square foot deduction.

Tax Tips

Beginning in late 2005, the U.S. lighting industry did a magnificent job of introducing EPAct on industry Web sites and in trade brochures. But practical problems made it difficult for facility executives to take advantage of the deductions. Applying EPAct requires interdisciplinary skills involving engineering, energy management and tax concepts that aren't normally part of the basic skill set of any single professional. The mainstream tax profession community is often not conversant with lighting electrical wattage, HVAC energy efficiency and building envelope fenestration concepts. Likewise, the facilities community generally isn't familiar with tax deductions and normally doesn't use income tax benefits as part of the project capital authorization process.

Initially, the lighting industry described the basic EPAct concepts and then recommended that facility executives seek tax advice. Increasingly, the lighting industry is engaging specialized tax consulting firms that have the required skill set necessary to identify, analyze and capture the EPAct benefits.

Today, companies are beginning to obtain substantial tax savings ranging from a few thousand dollars for small projects to tens of millions of dollars for large national property holders.

To date, the most common lighting EPAct projects involve distribution centers, industrial facilities and retail spaces. But EPAct deductions have also been gained for lighting projects in office buildings, supermarket chains, restaurants, assisted living facilities, hotels and other types of buildings.

There is a great deal of synergy between EPAct and the U.S. Green Building

WATT STOPPER

DW-200 wall switch occupancy sensors combine passive infrared and ultrasonic technologies. Sensors contain two relays for controlling two independent lighting loads or circuits. Products have high sensitivity and dense coverage and include selectable walk-through, test and presentation modes. **CIRCLE #263**

PHILIPS LIGHTING

Luxeon Rebel power LEDs are engineered for operation between 350 mA and 1000 mA, and can exceed 70 lumens per watt at 350 mA. Product can deliver more than 160 lumens at higher drive currents. Product has a 3mm by 4.5mm footprint. Ceramic-based package is designed

to withstand high heat with a maximum junction temperature of 150 degrees C. Available in warm, neutral and cool-white with correlated color temperatures (CCTs) of 3,000K, 4,100K and 6,500K respectively. **CIRCLE #264**

NOVITAS

SuperSwitch 2 occupancy switches adjust sensitivity and time delay automatically and immediately in response to occupant behavior, eliminating the need to "learn" behavior patterns over time. Switch fits into a designer-style wallplate. With manual on mode, lights are not switched on until touchplate is pressed. **CIRCLE #265**

ACCULITE

Exeter E3 Series luminaires feature an extended range of decorative trims and lenses for commercial and retail environments. Based on the company's glass, acrylic and aluminum optical assemblies. **CIRCLE #266**

NORTH AMERICAN ENERGY GROUP

LED wall packs are designed for security, accent and perimeter lighting applications. Packs are rated at 100,000 hours of operation, feature 80 percent energy savings over HID, and require virtually no maintenance. Available in 150w or 250w equivalent and in 120/277v. **CIRCLE #272**

Council's Leadership in Energy and Environmental Design (LEED) green building rating system. LEED requires computer modeling to document target levels of energy efficiency; EPAct also requires computer modeling for HVAC, building envelope, whole-building and some lighting deductions. More importantly, LEED generally requires adherence to ASHRAE 90.1-2004 energy-efficiency requirements, meaning that LEED projects will generally either qualify for EPAct tax deduction or come very close. What's more, 90.1-2004 is the basis for code in some states.

For example, office buildings qualify for EPAct at the .975 watts per square foot level and ASHRAE 90.1-2004 sets a maximum of 1 watt per square foot for office buildings. So a building planned to meet 90.1-2004 only needs to reduce lighting energy use by .025 watts per square foot to qualify for an EPAct deduction. Accordingly, leading office building developers are increasingly setting their office building lighting requirements at less than .975 watts per square foot so that they both meet the requirements of ASHRAE 90.1-2004 and qualify for EPAct. It seems likely that the LEED-qualified professionals will begin to realize that EPAct provides meaningful economic incentives to support their LEED initiatives.

The modeling required to qualify for a whole-building deduction under EPAct is very similar to LEED modeling. However, for separate systems modeling relating to lighting, HVAC and the building envelope, EPAct building modeling requires taking a different approach, one that most engineers are not familiar with. Facility executives should be sure that their engineers understand, in-depth, the computer modeling requirements of EPAct.

EPAct Lighting Success Stories

EPAct has made it possible for many warehouses, distribution centers and industrial property owners to realize substantial tax deductions. For example, the Genlyte supply division facility in Union, N.J., replaced older metal halide lighting with energy-efficient fluorescent lighting. In the assembly/parts facility, 240 metal halide fixtures with a rating of 455 watts per fixture were changed over to four-lamp T5 fixtures with a rating of 236 watts per fixture. In the warehouse, approximately 40 metal halide fixtures were replaced with more energy-efficient six-lamp T5 fixtures as well.

With these changes, lighting energy use for the assembly/parts facility fell from 1.33 to .84 watts per square foot. For the warehouse, lighting energy use

SHOWCASE LIGHTING

dropped from .56 to .48 watts per square foot. The result was a 35 percent reduction in lighting energy cost and an EPAct tax deduction exceeding $100,500.

The building industry is increasingly recognizing the substantial value of EPAct-related lighting upgrades for both energy savings and tax deductions. For the first time, national property owners have a national lighting standard energy target that provides national economic benefits. If the EPAct extension bill is enacted, as expected, virtually every US commercial and government building will have the opportunity to benefit from this legislation. BOM

Charles Goulding, an attorney and certified public accountant, is president of Energy Tax Savers, Inc. Jacob Goldman is a tax consultant and Siddharth Sheth is an engineer with the firm. The firm has developed complimentary EPAct designer guides for major building categories including distribution centers, offices, pharmaceutical facilities, hotels and schools.

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