The Tax Aspects of "Daylight Harvesting"

By Charles Goulding, Jacob Goldman and Taylor Goulding

Charles Goulding, Jacob Goldman and Taylor Goulding discuss tax incentives available for taxpayers achieving specified energy cost reductions as a result of certain investments. They focus on tax benefits available to taxpayers implementing daylight harvesting systems, which maximize the utilization of daylight within buildings.

As a result of higher energy costs and new and improved products, architects and building engineers are moving quickly to allow more natural daylight into buildings. The ability to maximize the utilization of more daylight within a building is called daylight harvesting.

This article begins with a brief summary of the Energy Policy Act of 2005 tax incentives for building energy investments and then focuses specifically on daylight harvesting tax incentives.

Energy Policy Act Overview

The Energy Policy Act of 2005 (EPAct)[1] added Code Sec. 179D, which provides for up to a $1.80 per square immediate tax deduction for building investments that achieve specified energy cost reductions above ASHRAE 2001[2] building energy code standards. A one time $1.80 per square foot deduction is the maximum tax deduction, but within the $1.80 deduction amount there are three potential subsystem tax deductions: up to 60 cents per square foot for lighting and lighting controls; HVAC (Heating ventilation and air conditioning); and the building envelope. The building envelope is the perimeter of the building including roof, walls, windows, doors and floor/foundation. The IRS published Notice 2006-52[3] on June 2nd, 2006, which provides guidance on how the commercial building tax incentives work.

To document the lighting electricity reduction and meet the EPAct statutory and notice requirements, the lighting project must have a watts per square foot spreadsheet that supports the EPAct watts per square foot thresholds and must meet seven other tax procedural requirements. To document the HVAC, building envelope and whole building EPAct requirements, the project must be supported by an IRS-approved building energy computer software model. The model must incorporate an ASHRAE 2001 reference building in a prescribed way that most first time EPAct engineering modelers are not familiar with. A list of the qualifying modeling software is provided later in this article.

Under current law, EPAct tax incentives are available for projects placed in service after December 31st, 2005 and before January 1st, 2009. Multiple bills currently before Congress propose to extend the EPAct for one or more years.

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Daylight Harvesting– The History

Pre-Edison's invention of the incandescent bulb, architects and builders were adept at maximizing daylight entry through wall windows, roof windows and banks of large clerestory windows in churches and cathedrals.

Post-Edison electric lighting regrettably resulted in greatly reduced building daylight penetration. With inexpensive electricity, builders cut costs by eliminating windows and designing simpler roofs. Probably the most pervasive result of this trend was the first wave of windowless big box retail stores with virtually no daylight exposure through the roof or walls. Many older buildings even painted over skylights, which in many cases are now being restored.

The lighting controls component of a daylighting system saves substantial lighting electrical energy costs since the lights will typically be shut off for a major portion of the day.

Today's Products

To optimize lighting performance and minimize energy costs, architects and builders are now using a combination of three products:

1. Energy Efficient Lighting
2. Lighting Controls
3. Daylight Harvesting

Energy Efficient Lighting

Today's lighting products are 25 to 60 percent more energy efficient than products from 2001. Code Sec. 179D provides 60 cent per square foot tax incentives for installing the new energy efficient lighting with qualifying projects.[4]

Lighting Controls

Lighting controls adjust lighting levels by dimming lighting or shutting lighting off entirely when appropriate. Familiar dimming applications include restaurants where light levels augment ambiance. Lighting may be shut off at night, during nonworking hours including weekends or when human occupants exit rooms or a section of a large space. Historically, dimming fixtures shortened fixture bulb/lamp life so there was a trade between energy savings and increased bulb replacement. New technology is addressing this issue. William McShane, the head of sustainable lighting for Phillips/Crescent/Stonco, says "We are moving quickly to provide products that incorporate sensors and preserve existing bulb/lamp life cycles."

The lighting controls component of a daylighting system saves substantial lighting electrical energy costs since the lights will typically be shut off for a major portion of the day. The solar shades will save HVAC costs. On hot days, heat will be filtered out, saving electrical costs. On cold days, the solar shade will retain heat, saving heating costs

Daylight Harvesting

Daylight Harvesting utilizes light sensitive sensors and smart ballasts to adjust and balance incoming or receding natural light with the building lighting. Daylighting systems are optimized when window glazing and window coverings such as solar shades are also employed. Solar shades act to monitor the sun's heat transfer, which can reduce heating and cooling costs. The shade system should be designed to control direct sun, minimize window glare and maximize daylight and view.

Tremendous Growth Opportunities

On June 30, 2005, the U.S. Department of Energy issued a seminal daylighting study related to the New York Times' headquarters daylighting project, advocating widespread implementation of daylighting. In that report, Lawrence Berkeley National Laboratory experts state:

> The technical energy savings potential for smart integrated window-daylighting systems is excellent and can yield significant reductions in US commercial building energy uses if adopted by a significant percentage of the market. However, conventional; automated shades and daylighting controls have been commercially available for over two decades with less than 1-2% market penetration in the US.[5]

One of the nation's leading sellers of daylighting systems is Kay & Sons of Philadelphia. Barry Kay, the President, described the changing role of day-

lighting systems this way: "Right now my take is that daylighting is becoming a leading element in buildings of the future. In the past, the shading function was about window fashions. Now it is more about managing light and energy in buildings." Kay also points out that with today's lighting control systems, facilities managers can watch the energy savings from daylighting on a real time basis.

Tax Opportunities

There are multiple tax savings opportunities from daylight harvesting systems.

The EPAct provides two paths to obtain tax savings for lighting controls:

1. Free Riding Path
2. Modeling

Free Riding Path[6]

Those facilities that already have energy efficient lighting at the EPAct qualifying level can obtain an immediate tax deduction of up to 60 cents per square foot using the free riding path, provided they meet all of the normal EPAct lighting project requirements.

With free riding, the energy performance accomplishments of the existing lighting platform are taken into account and the EPAct permits a tax deduction provided that there is a new lighting investment. Many companies that already have energy efficient lighting are using free riding to obtain tax deductions for investments in further energy reducing lighting, lighting controls, sensors and daylight harvesting.

Modeling

With the EPAct computer simulation energy modeling approach, the amount of tax deduction is a direct function of the energy reduction accomplished by the daylighting system. In general, the greater the window to wall ratio, the greater the amount of energy and tax savings is. Simply stated, with more windows, you can get more daylight and save more lighting electrical costs. To document compliance with the modeling requirements, taxpayers must use approved modeling software. To date, the IRS has approved the following software:

- **DOE-2.1E** Version 119
- **DOE-2.1E-JJH** Version 130
- **EnergyGauge Summit** Version 3.1, Version 3.11, Version 3.13, Version 3.14
- **EnergyPlus** Version 1.3.0.018, Version 1.4.0.025, Version 2.0.0.025, Version 2.1.0.023
- **EnerSim** Version 07.11.30
- **Green Building Studio** Version 3.0, Version 3.1
- **Hourly Analysis Program (HAP)** Version 4.31, Version 4.34
- **Owens Corning Commercial Energy Calculator (OC-CEC)** Version 1.1
- **TRACE 700** Version 6.0.2.1, Version 6.1.0.0, Version 6.1.1.0, Version 6.1.2.0
- **VisualDOE** Version 4.1 build 0002

Solar Shades

Solar shades are relatively expensive personal property building envelope items. Taxpayers can use seven year tax depreciation, the Code Sec. 179 expense provisions and bonus depreciation to incentivize these purchases. Solar shades vary by color, material content, weight, thickness and fire rating. These variations mean that different solar shades have different solar properties that can be precisely quantified. The four major properties are solar transmittance, solar reflectance, solar absorption and visual transmittance. Ts-Solar Transmittance is the amount of solar energy that passes through a glazing material, expressed as a percentage. Rs-Solar Reflectance is a measure of material to reflect sunlight including visible, infrared and ultraviolet wavelengths. As-Solar Absorption is a measure of the solar energy that is neither transmitted nor reflected. Tv-Visual Transmittance is a measure of the percentage of visible light that passes through a glazing system.

Utility Rebates

Numerous utilities offer rebates for daylighting equipment. Some of the rebates are prescriptive, meaning the utility will provide a fixed dollar reimbursement per equipment component. Other rebates are KW based, meaning the rebate will be a function of the amount of electric usage reduction. States with lighting control rebates include: Arizona, Colorado, Idaho, New Jersey, New York and Wisconsin.

Craig Tropea, Director of Business Development at a national web-based utility rebate service provider called RealWinWin, Inc., says "We are experiencing a measurable increase in rebate processing for lighting, HVAC and building controls."

Conclusion

Daylighting systems provide tremendous energy cost reduction opportunities. With only a 2-percent market penetration and ever escalating energy

costs, more property owners will be analyzing these projects. Informed facilities managers and tax departments can use their expert knowledge to help let the light in.

ENDNOTES

1 Energy Policy Act of 2005 (P.L. 109-58).

2 ASHRAE 2001 is a standard of the American Society of Heating Refrigeration and Air Conditioning Engineers.

3 Notice 2006-52, IRB 2006-26, 1175.

4 *See* Charles Goulding, Jacob Goldman and Siddharth Sheth, *Tax Deductions Brighten Lighting Upgrades,* CORP. BUS. TAX'N MONTHLY, Oct. 2007, at 23.

5 U.S. Department of Energy, Building Technologies Program Environmental Technologies Division, Lawrence Berkeley National Laboratory, DAYLIGHTING THE NEW YORK TIMES HEADQUARTERS BUILDING (June 30, 2005) *available at http://windows.lbl.gov/comm_perf/pdf/Daylighting-NYTimes-cover.pdf.*

6 For a discussion on free riding, *see* D.W. Winiarski, E.E. Richmand and R. Biyani, U.S. Department of Energy, ANALYSIS OF POTENTIAL FREE-RIDER ELIGIBILITY FOR A PROPOSED COMMERCIAL BUILDING LIGHTING TAX DEDUCTION (Sept. 2004), *available at www.pnl.gov/main/publications/external/technical_reports/PNNL-145 93.pdf.*