The Tax Aspects of Thermal Storage and Time-of-Day Pricing

By Charles Goulding, Jacob Goldman and Taylor Goulding

Charles Goulding, Jacob Goldman and Taylor Goulding discuss deduction opportunities for property owners with thermal storage systems.

Tax departments with company facilities in high electricity cost markets can help their facility's managers to use Energy Policy Act of 2005 (EPAct)[1] tax incentives for new thermal storage systems. These departments can then further expand heating, ventilation and air conditioning (HVAC) tax incentives related to existing thermal storage systems.

Thermal storage systems make ice at night during off peak hours when rates for electricity are typically cheaper. The alternative is running the high thermal storage at daytime peak hours when electricity costs, particularly in high-cost electric markets, are substantially higher. There are major areas throughout the nation that have a difficult time producing enough electricity during the daytime summer periods when the demand for air conditioning use is the highest.

The EPAct tax provisions astutely encourage property owners to overcome the electricity price differential by capitalizing on the so-called time-of-day pricing difference with thermal storage systems. As set forth under the Electricity Section of EPAct, each electric utility must offer each of its customers a time-based rate schedule.[2] Consequently, all U.S. property owners have the opportunity to use time of day pricing to their advantage to avoid high electricity costs during peak time periods.

Tax departments with large property portfolios need to be cognizant of when their respective facilities may be considering or have already purchased thermal storage systems. Some leading brands of thermal storage systems include Calmac (www.calmac.com), Baltimore Aircoil (www.baltimoreaircoil.com) and Ice Energy (www.ice-energy.com/Default.aspx). Because thermal storage systems save so much daytime electricity use, state and local utility programs will often provide large rebates for thermal storage systems.

The Tax Opportunity

New thermal storage systems, particularly when installed with new high-efficiency chillers and package units, are often eligible for tax deductions, which can be achieved in either one of two ways. As discussed in one of our previous articles, "New Efficient HVAC Drives Large Tax Deductions for Buildings," immediate EPAct HVAC tax deductions of 60 cents per square foot are available for achieving a 16.67 percent energy cost reduction compared to the ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) 2001 building energy code standard. Another option for achieving a tax opportunity is a $1.80 per square foot whole building tax deduction when the thermal storage system results in the overall

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Figure 1.

Minimum Efficiency to Obtain EPAct Tax Deductions When Combined with Time-of-Day Pricing		
Time-of-Day Pricing Differential	**HVAC Equipment Efficiency compared to ASHRAE 90.1 Standard**	**% Improvement of Building Energy Cost Over Standard**
50%	-1%	16.98%
45%	2%	16.84%
40%	5%	16.80%
35%	8%	16.87%
30%	11%	17.05%
25%	13%	16.71%
20%	16%	17.08%
15%	18%	16.91%
10%	20%	16.80%
5%	22%	16.77%
1%	24%	17.07%
Assumptions: 50% of HVAC load provided by Thermal Storage HVAC represents 70% of Building Energy Use [2] (excluding receptacle and process loads)		

[2] 2003 CBECS Detailed Tables (*www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/detailed_tables_2003.html#consumexpen03,* Table E1).

Figure 2. Northwind Phoenix Project Potential EPAct Deduction from Further Energy Reducing Investments

The following table presents the EPAct tax deductions available for commercial owners or designers of the state-owned facilities in the Northwind Phoenix project.

Facility	Square Footage	Lighting		HVAC Maximum Deduction	Building Envelope Maximum Deduction	Total
		Minimum Deduction	Maximum Deduction			
Chase Field	1,300,000	$390,000	$780,000	$780,000	$780,000	$2,340,000
US Airways Center	14,000	$4,200	$8,400	$8,400	$8,400	$25,200
Arizona Biomedical Collaborative	86,523	$25,957	$51,914	$51,914	$51,914	$155,742
Phoenix Convention Center	2,000,000	$600,000	$1,200,000	$1,200,000	$1,200,000	$3,600,000
UofA College of Medicine — Phoenix	90,000	$27,000	$54,000	$54,000	$54,000	$162,000
4th Avenue Jail	578,000	$173,400	$346,800	$346,800	$346,800	$1,040,400
Remaining Square Feet*	8,794,485	$2,638,346	$5,276,691	$5,276,691	$5,276,691	$15,830,073
Total:	12,863,008	$3,858,903	$7,717,805	$7,717,805	$7,717,805	$23,153,415

* The remaining square feet served by Northwind Phoenix includes property owners such as: IGC/TGen Headquarters, One and Two Arizona Center Building, Symphony Hall, Herberger Theater Center, Sheraton Hotel, ASU Student Housing, CityScape, ASU University Center, ASU School of Journalism, Security Building, 44 Monroe, Superior Court Complex, Orpheum Lofts, One11 West Monroe, Dodge Theatre, Hanny Restaurant and Digital Van Buren.

building having a 50percent energy cost reduction compared to ASHRAE 2001 standards.

Existing thermal storage systems present tremendous overall energy tax savings opportunities using the HVAC free riding concept. With free riding, any additional HVAC investment that either reduces energy usage or increases the energy cost reduction, so that it achieves or exceeds a 16.67 percent cost reduction, will qualify for the 60 cent per square foot tax deduc-

Continued on page 37

Sample Smart Grid Utility Stimulus Funding Requests

There is an increasing convergence between smart grid and software applications. Utility tax departments should be upgrading and tagging their fixed asset systems to recognize eligible equipment purchases, and developing tax depreciation polices covering smart grid versus software depreciation determinations.

Utilities as Tax Credit Beneficiaries

Pursuant to the Emergency Economic Stabilization Act of 2008,[4] the prior prohibition on utilities obtaining tax credits from power purchase agreements related to customers has been removed. This is a major policy change and provides powerful financial incentives for utilities that need to expand alternative energy use both for demand management and for required emission reduction.

Moreover, because of the expansion and extension of a wide range of alternative energy tax credits, the utilities have a lot more energy tax credits to work with and the certainty of availability. This means that many ratepayers that don't have tax capacity may be interested in structuring a power purchase agreement with the utility, whereby the utility will utilize the tax credit. In addition, in July 2009 the government announced the details of the new grant program that provides the economic equivalent of all the tax credits in the form of a grant. Forward-looking utility tax departments should be working closely with their legal and operational counterparts to ensure that tax is properly integrated into all of these fast growing initiatives.

Some major utilities are involved in various alternative energy projects, including Austin Energy, Florida Power & Light (FPL), Portland General Electric (PGE), PacifiCorp, Sacramento Municipal Utility District (SMUD), Xcel Energy and Public Service Electric & Gas Co., along with California utility Pacific Gas & Electric (PG&E). "Because PG&E has a 'tax appetite' and can take advantage of the tax credit, the utility is investing directly in solar energy," according to PG&E CEO Peter Darbee in a CNET article this spring. The table below summarizes some of the major utilities' alternative energy investments.

Conclusion

As a result of major changes in federal policy involving commercial building energy efficiency, smart grids, smart meters, alternative energy credits, and grants, the role of tax departments in utilities has greatly expanded. This is a new and exciting area for tax professionals interested in implementing America's energy policy initiatives.

Endnotes

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

2 See Charles Goulding, Jacob Goldman and Taylor Goulding, *New Tax Incentives for Electricity Smart Meters and Smart Grid Investments*, Corp. Bus. Tax'n Monthly, Apr. 2009, at 29.

3 American Recovery and Reinvestment Act (P.L. 111-5).

4 Emergency Economic Stabilization Act of 2008 (P.L. 110-343).

Thermal Storage

Continued from page 14

tion. The chart below demonstrates how even small equipment efficiency improvements, when combined with time-of-day pricing and thermal storage, can generate the requisite cost improvement to qualify for the 60 cent per square foot tax deduction.

Existing thermal storage systems in buildings at the 50 percent energy cost savings threshold can use the EPAct whole building free riding concept to obtain a 1.80 per square foot tax deduction for a wide range of further energy cost reducing investments. To utilize this opportunity, a new further energy reducing investment must occur during an EPAct year. Accordingly, tax managers dealing with facilities that already have thermal storage systems should give strong consideration to making further energy cost reducing investments before December 31, 2013.

Central Plant and District Thermal Storage Systems

Large-scale storage systems are sometimes used in central plants supporting multiple buildings or district wide systems supporting multiple independent buildings. When thermal storage is used with these systems, there is an opportunity for tremendous HVAC and whole building tax savings for every building supported by the central plant thermal storage system. One of the most prominent examples of this type of large-scale ice thermal storage system is the Northwind Phoenix cooling system in Phoenix, Arizona. This cooling system serves buildings ranging from 3,000 to more than 1,900,000 square feet.[3] As of July 2009, Northwind Phoenix serves 12,863,008 square feet of downtown Phoenix.[4]

The potential tax deductions presented above are available for the commercial building owner or the government building designer, if qualifying. To achieve the HVAC and building envelope tax deductions, each building seeking tax deductions will have to be modeled in IRS-approved software.

Conclusion

The Energy Policy Act of 2005 time-of-day pricing mandate means that time-of-day pricing electricity cost savings will be available throughout the country. This means that property owners who already have existing thermal storage systems or are contemplating thermal storage systems have the opportunity to obtain large tax deductions for qualifying building projects completed before December 31, 2013.

Endnotes

1. Energy Policy Act of 2005 (EPAct) (P.L. 109-58).
2. H.R. 6—109th Congress: Energy Policy Act of 2005, www.govtrack.us/congress/bill.xpd?bill=h109-6, Act Sec. 1252.
3. Mike Perfette, Director, Operations and Maintenance of Northwind Phoenix, *Night Ice: Thermal Energy Storage Advantages to the Electricity Grid.*, District Energy - IDEA Centennial Conference, "Local Energy, Global Solution," June-July 2009 (www.districtenergy.org/2009-07-10-files/powerpoint/3B1_Perfette.pdf).
4. *Id.*

Hospitals Tax Aspects

Continued from page 16

requirements) makes a chiller is a perfect interface for tax saving. The optimal way to right-size and select a chiller is to model a building using building energy simulation software and the HVAC EPAct tax deduction, which requires building energy simulation modeling in IRS-approved software.

The emphasis on air handling equipment is also crucial for hospitals since it is particularly important for hospitals to replace or ventilate existing air with fresh outside air. Air handling equipment includes heat recovery ventilation, energy recovery ventilation, and demand recovery ventilation. These are all good techniques to improve air quality, reduce energy costs, and help generate EPAct HVAC tax deduction.

Commissioning is the process of ensuring that all of the building's energy systems are calibrated and performing as they should. Supplemental load reduction involves measures to reduce other electrical loads, which in a hospital can be kitchen equipment, TVs, computer monitors, laundry equipment, MRIs, and laboratory equipment.

Hospitals are also excellent candidates for special purpose HVAC measures that can greatly reduce energy costs and qualify for large EPAct HVAC tax deductions. Such measures include thermal storage and geothermal. Thermal storage systems that make ice at night and cool a building down during the day are able to use so-called "time of day pricing," and purchase electricity at night when it is generally much cheaper than a daytime electricity purchase. Geothermal systems will often qualify for large EPAct tax deductions and for commercial purchasers, there is a 10 percent credit or 10 percent grant under Code Sec. 48.

Building the LEED Way

One way for hospitals to attain energy efficiency and recognition for going green is building to LEED standards. LEED (Leadership in Energy and Environmental Design), developed and administered by the U.S. Green Building Council (USGBC), is a set of standards for environmentally sustainable construction. In 2007, the USGBC and Green Guide for Health Care (GGHC) entered into a partnership to develop tools, educational programs, and other activities and functions to support the health-care industry's efforts to go green.[3]

In 2009, the Dell Children's Medical Center of Central Texas became the first hospital in the world to achieve LEED status. Being a not-for-profit hospital, it is ineligible for any kind of tax incentives, but the building and measures taken are a good example of what type of design would generate tax incentives available to energy efficient buildings.[4]

Conclusion

The overall mandate to reduce medical costs, along with U.S. federal government-sponsored initiatives to reduce hospital energy costs, means that hospital energy management is getting a lot of attention. A variety of tax incentives can be used to support these initiatives, which can be helpful to all Americans.

Endnotes

1. Environmental Leader, *Hospitals Due for Energy Efficiency Overhaul*, Environmental Leader, Jul. 27, 2009, *www.environmentalleader.com/2009/07/27/hospitals-due-for-energy-efficiency-overhaul.*
2. GE Consumer & Industrial Lighting, *UV Lamps for Germicidal Applications*, GE Brochure.
3. Taryn Holowka, *USGB & GGHC Working Together to Green the Healthcare Industry*, USGBC News Release, *www.usgbc.org/Docs/News/USGBC%20GGHC%20112907.pdf.*
4. Claire Bloxm, *Dell Children's Hospital of Central Texas Receives LEED-Platinum Certification from the U.S. Green Building Council*, Talk Medical, Mar. 2, 2009, *http://talk.news-medical.net/profiles/blogs/dell-childrens-hospital-of.*