

# 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.

**T**ax departments with company facilities in high electricity cost markets can help their facility's managers to use Energy Policy Act of 2005 (EPAAct)<sup>1</sup> 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 EPAAct 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 EPAAct, each electric utility must offer each of its customers a time-based rate schedule.<sup>2</sup> Consequently, all U.S. property own-

ers 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](http://www.calmac.com)), Baltimore Aircoil ([www.baltimoreaircoil.com](http://www.baltimoreaircoil.com)) and Ice Energy ([www.ice-energy.com/Default.aspx](http://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 EPAAct 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 <sup>2</sup> (excluding receptacle and process loads)

<sup>2</sup> 2003 CBECS Detailed Tables ([www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/detailed\\_tables\\_2003.html#consumexpen03](http://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
<b>Total:</b>	<b>12,863,008</b>	<b>\$3,858,903</b>	<b>\$7,717,805</b>	<b>\$7,717,805</b>	<b>\$7,717,805</b>	<b>\$23,153,415</b>

\* The remaining square feet served by Northwind Phoenix includes property owners such as: IGCT/Gen 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 ad-

ditional 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 deduction. 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 EAct 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 EAct 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.<sup>3</sup> As of July 2009, Northwind Phoenix serves 12,863,008 square feet of downtown Phoenix.<sup>4</sup>

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

- <sup>1</sup> Energy Policy Act of 2005 (EAct) (P.L. 109-58).
- <sup>2</sup> H.R. 6—109th Congress: Energy Policy Act of 2005, [www.govtrack.us/congress/bill.xpd?bill=h109-6](http://www.govtrack.us/congress/bill.xpd?bill=h109-6), Act Sec. 1252.
- <sup>3</sup> 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](http://www.districtenergy.org/2009-07-10-files/powerpoint/3B1_Perfette.pdf)).
- <sup>4</sup> *Id.*

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